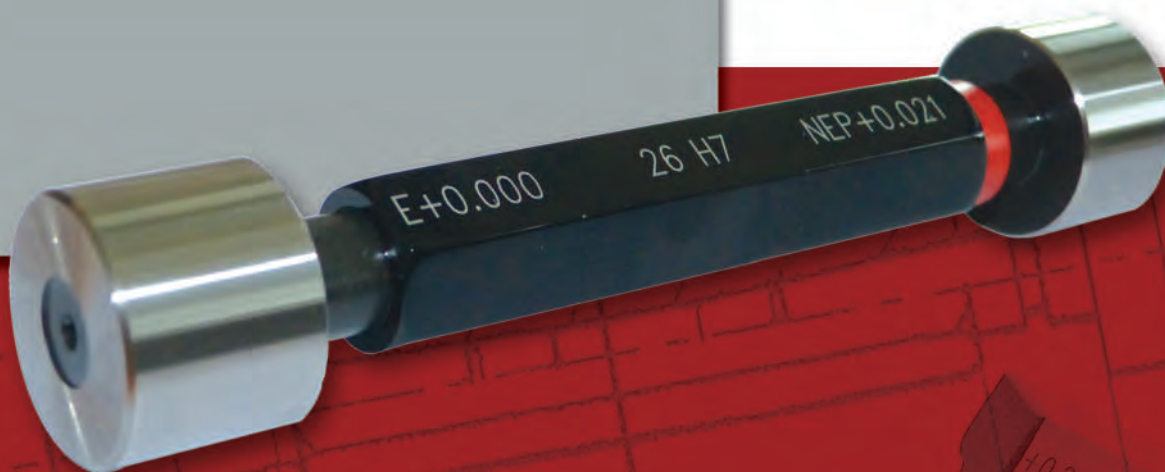




SETTING GAUGES - GAUGES - INSPECTION
TION - SETTING GAUGES - GAUGES - IN
CALIBRATION - SETTING GAUGES - GA
SYSTEMS - CALIBRATION - SETTING GAUG
TION SYSTEMS - CALIBRATION - SETTING

GAUGE PRO

- SETTING GAUGES
- GAUGES
- INSPECTION SYSTEMS
- CALIBRATION



www.gauge-pro.com

OUR PRODUCT RANGE



SETTING GAUGES

P. 3



INSPECTION OF PLAIN SURFACES

P. 9



GAUGES FOR INSPECTION OF THREADS

P. 27



THE CHECKING OF SPLINES AND GEARS

P. 39



SPECIAL GAUGES

P. 45



SPECIAL EQUIPMENT AND SOLUTIONS

P. 55

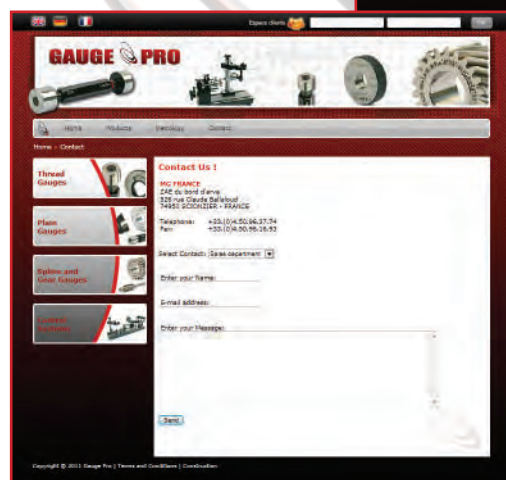
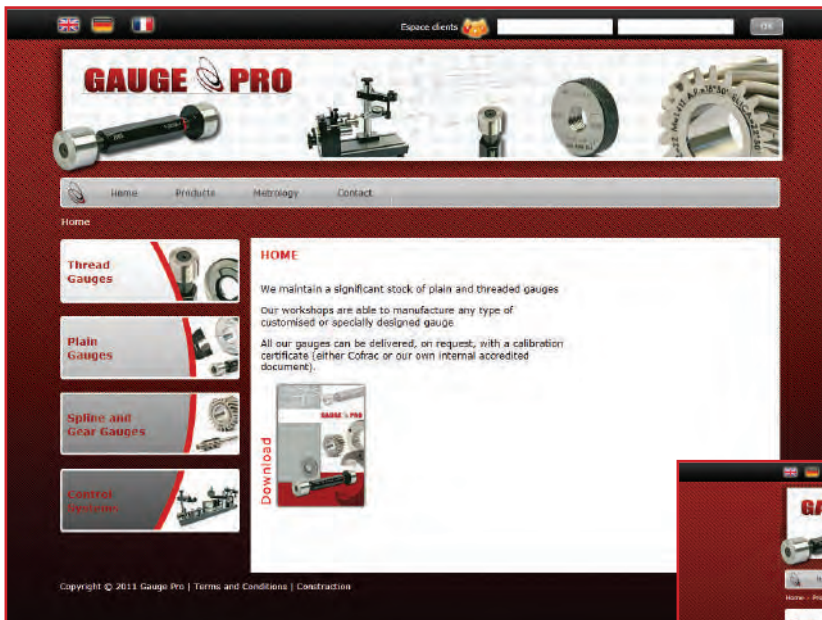


METROLOGY AND CALIBRATION

P. 119



For further information, visit our website at
www.gauge-pro.com



- Find all our items online
- Login in and request a quotation
- Contact us : sales@gauge-pro.com

SETTING GAUGES





Materials Used

For compliance to the standards, we use steels 100C6, Z155CVD12.1, K100 (X210Cr12) as well as carbide.

The surface hardness of the measuring surfaces is 670 minimum HV30 for rings, plugs and measuring pins and of 800 minimum HV30 for slip blocks/gauges.

Each different material imparts to the gauges certain properties relevant to their use. It is therefore necessary to give us the maximum amount of information on the use of the gauge (in laboratory, workshop...) so that we may offer the best suited product to you.

The different types according to the standard

For cylindrical type gauges (Ring or Plug), there exists two principal types according to standards **NF E 11.011 and NF E 11.012** :

- **Type "A"** : this standard of gauge is used to set or calibrate apparatus with more than 2 points of contact (internal micrometer, pneumatic plug ...) or for measuring in different planes. These standards are characterized in particular by being one geometrical tolerance smaller than those of type "B".
For example, a standard ring of 10 mm "A" in quality 1 must have a cylindrical tolerance of 0,5 μm whereas a ring of the type "B" in quality 1 must have a cylindrical diameter of 2 μm .
- **Type "B"** : this standard of gauge is used to calibrate apparatus having 2 points of contact or measuring in only one plane.
In this case, the axis of measuring must be fixed on the gauge by a feature. The dimension of reference engraved on the ring indicates that the position of measuring is on the axis in the middle of ring.
- **Qualities 0,1,2,3** : In both cases (rings and plugs), the quality specifies the actual tolerance of the dimension of the cylinder. Quality "0" is a special case: the interval of tolerance is large ($\pm 200 \mu\text{m}$) but then the geometrical tolerances are very small (0,35 μm type "A" or 0,6 μm type "B").
In this example, the engraved dimension constitutes the reference value.

The different types of master pins are used in general ways as a useful auxiliary aid with other measuring devices for the control of parts (gears, splines, threads....) or to control diameters.

C : This type of product is explained in the chapter "the control of plain surfaces" (from page 9). Several classes are covered by NF E 11.017 standards:

- **Class 1, 2, 3** : for the checking of products.
- **Class K** : reserved for the checking of thread gauges.

For slips/gauge blocks, there exists several qualities or classes (K, 0, 1,2) defining the precision as well as the geometry of the block.

It should be noted that the class "00" was removed in standard NF EN ISO 3650.

- **Class « K »** : used for the calibration of other slips/gauge blocks.
- **Class « 0 »** : used as the reference standards within a company.
- **Class « 1 »** : used for working standards or reference standards (according to the precision of products manufactured by the company).
- **Class « 2 »** : used for general work.

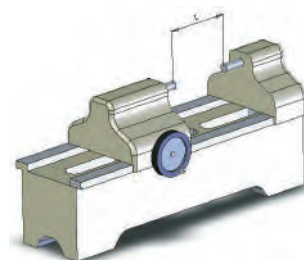




Individual & Boxed Slips / Gauge Blocks



Measurement A in mm	In Increments of	Section B x C in mm	Steel class				Carbide class				Ceramic class			
			0	1	2	K	0	1	2	K	0	1	2	K
0.5		30 x 9	X	X	X		•	•	•					
0,51 - 0,99	0.01	30 x 9					•	•	•					
0,991 - 0,999	0.001	30 x 9					•	•	•					
1.0005		30 x 9	X	X	X		•	•	•					
1,001 - 1,009	0.001	30 x 9	X	X	X		•	•	•					
1,00 - 1,49	0.01	30 x 9	X	X	X		•	•	•					
1,50 - 1,9	0.1	30 x 9	X	X	X		•	•	•					
2		30 x 9	X	X	X		•	•	•					
2,50 - 10	0.5	30 x 9	X	X	X		•	•	•					
10 - 25	0.5	35 x 9												
30,00 - 100,00	10	35 x 9	X	X	X		•	•	•					
125,00 - 250,00	25	35 x 9	X	X	X									
300 - 1000	100	35 x 9	X	X	X									



Availability

X : slip/gauge block available in stock or delivery within 10/15 days.

• : slip/gauge block available in less than 4 weeks.

For the other sizes, please contact us.

The reference standard

The standard applied is the NF EN ISO 3650.

Characteristic

The slip/gauge block can be delivered with a certificate of calibration.

Example of an order

Steel slip/gauge block of 1mm CI 2.



Box of Slips	Containing	Steel class				Carbide class				Ceramic class			
		0	1	2	K	0	1	2	K	0	1	2	K
A set of 32 slips	1 slip of 1,005 mm												
	9 slips of 1,01 to 1,09 mm - In increments of 0,01 mm												
	9 slips of 1,1 to 1,9 mm - In increments of 0,1 mm	X	X	X						X	X		
	9 slips of 1 to 9 mm - In increments of 1 mm												
	4 slips : 10-20-30-50 mm												
A set of 47 slips	1 slip of 1,005 mm												
	9 slips of 1,01 to 1,09 mm - In increments of 0,01 mm												
	9 slips of 1,1 to 1,9 mm - In increments of 0,1 mm	X	X	X						X	X		
	24 slips of 1 to 24 mm - In increments of 1 mm												
	4 slips : 25-50-75-100 mm - In increments of 25 mm												
A set of 87 slips	9 slips of 1,001 to 1,009 mm - In increments of 0,001 mm												
	49 slips of 1,01 to 1,49 mm - In increments of 0,01 mm												
	19 slips of 0,5 to 9,5 mm - In increments of 0,5 mm	X	X	X									
	9 slips of 1,5 to 9,5 mm - In increments of 1 mm												
	10 slips of 10 to 100 mm - In increments of 10 mm												
A set of 103 slips	1 slip of 1,005 mm												
	49 slips of 1,01 to 1,49 mm - In increments of 0,01 mm												
	49 slips of 0,5 to 24,5 mm - In increments of 0,5 mm	X	X	X									
	4 slips : 25-50-75-100 mm - In increments of 25 mm												

Availability

X : slip/gauge block available in stock or delivery within 10/15 days.

For the other sizes (for example sets of 112 and 122), please contact us.

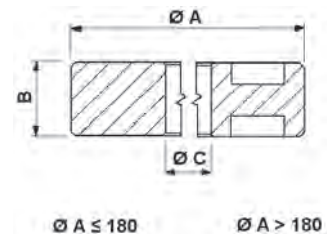
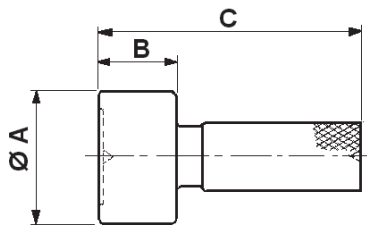
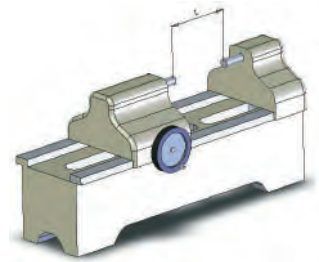
The reference standard

The standard applied is the NF EN ISO 3650.

Example of an order

Box of 47 slips/gauge blocks of class 1 made out of Steel.

Plain Plug Setting Gauges



from	A	to	B	C
	up to 15 mm		16	90
ø 2,5		ø 5	10	22
ø 15		ø 50	30	100
ø 50		ø 100	30	105

from	A	to	B	C
				H13
ø 50		ø 80	18	ø 20
ø 80		ø 125	20	ø 20
ø 125		ø 180	25	ø 20
ø 180		ø 250	25	ø 25
ø 250		ø 300	30	ø 30

Availability

No finished parts held in stock, please contact us for a lead-time.

The reference standard

The standard applied is the NF E 11.012 for the level of precision of gauge diameter.
The shape of the gauge can be manufactured to customer specifications.

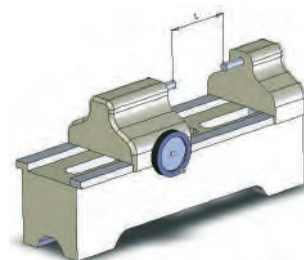
Options

Various materials are possible : K100, Carbide, Steel...

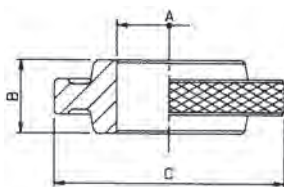
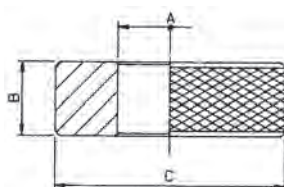
Example of an order

Plain plug setting gauge ø 50 A1.

Plain Ring Setting Gauges



A		B	C
From	To	mini	
Ø 1	Ø 2,5	4	22
Ø 2,5	Ø 5	5	22
Ø 5	Ø 10	8	32
Ø 10	Ø 15	10	38
Ø 15	Ø 20	12	45
Ø 20	Ø 25	14	53
Ø 25	Ø 32	16	63
Ø 32	Ø 40	18	71
Ø 40	Ø 50	20	85
Ø 50	Ø 60	20	100



A		B	C
From	To	mini	
Ø 60	Ø 70	24	112
Ø 70	Ø 80	24	125
Ø 80	Ø 90	24	140
Ø 90	Ø 100	24	160
Ø 100	Ø 110	28	170
Ø 110	Ø 120	28	180
Ø 120	Ø 130	28	190
Ø 130	Ø 140	28	200
Ø 140	Ø 150	28	212
Ø 150	Ø 160	28	224

7

Availability

Stock is held for class "B1".

- Ø 3 to Ø 30 mm in 1mm increments.
- Ø 30 to Ø 50 mm in 5mm increments.

The reference standard

The standard applied is the NF E 11.011 for the level of precision of gauge diameter.

The shape of the gauge can be manufactured to customer specifications.

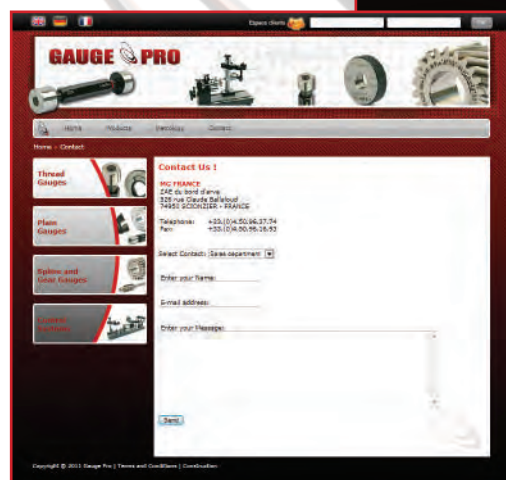
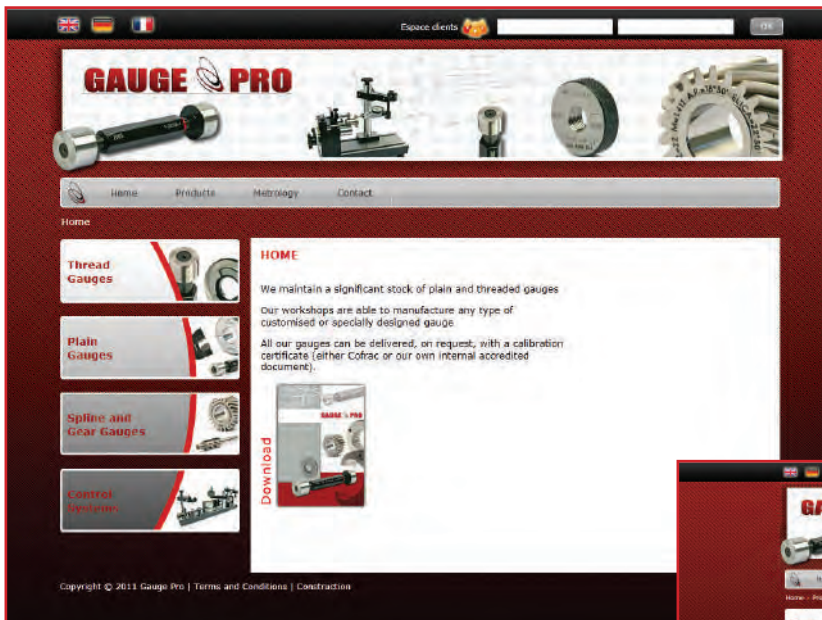
Options

Various materials are possible : K100, Carbide, Steel...

Example of an order

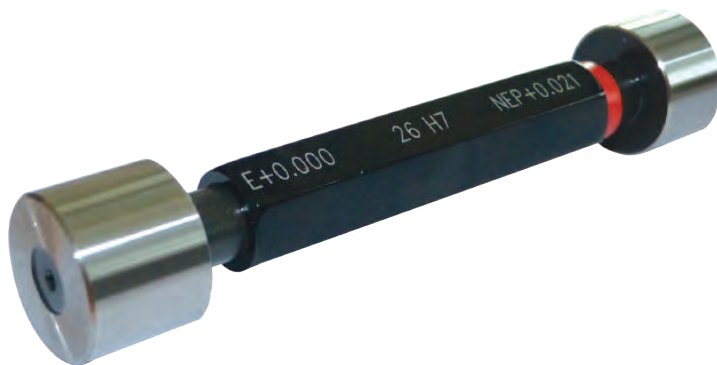
Plain ring setting gauge Ø 40.15 B2.

For further information, visit our website at
www.gauge-pro.com



- Find all our items online
- Login in and request a quotation
- Contact us : sales@gauge-pro.com

INSPECTION OF PLAIN SURFACES





Materials Used

For the manufacture of gauges we use steels 90MVC8, 100C6, Z155CVD12.1, stainless X105Cr17, K100 (X210Cr12) and carbide. Surface hardness of the measuring surfaces is 670 HV30 minimum for rings, plugs and measuring pins.

This hardness can be improved by the use of surface coatings which allow us to reach a surface hardness of 3700 HV. This point is further explained in the chapter "Special gauges".

Each type of material imparts to the gauges certain properties relevant to their use.

It is therefore necessary to give us the maximum amount of information on the use of the gauge (in laboratory, workshop...) so we may offer the best suited product to you.

The different types of gauges

The control of external diameters is achieved using plain rings and gap/snap gauges.

The control of internal diameters is achieved using measuring pins, plain plug gauges, flat limit plug gauges and flat limit plug gauges without handles.

The control of the width of undercuts or keyways can be achieved using parallel face limit keyway gauges.

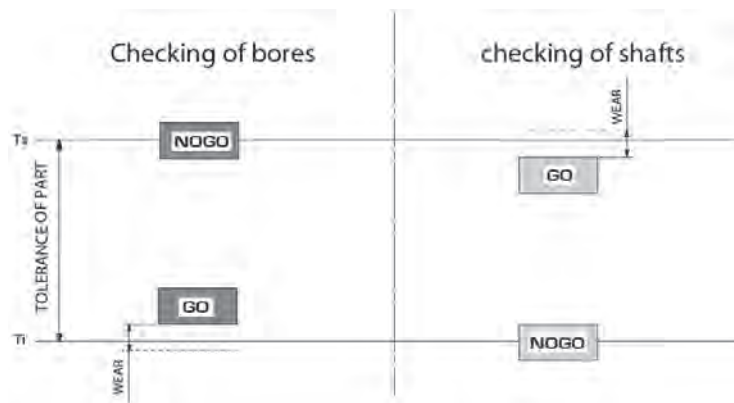
The control of cones or multiple planes (square profile, 6 sided...) can be done with gauges adapted to these types of form.

Specifics relating to the standard

The standards most used in the manufacture of plain gauges (rings, plugs, gap gauges and flat limit gauges) are NF E 02.202 and NF E 02.205.

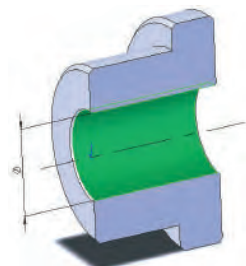
These standards foresee wearing of the GO gauges. This results in adjusting a proportion of the gauges tolerance as shown in the drawing below.

By default this system is used, but we can also adapt to your specifications.



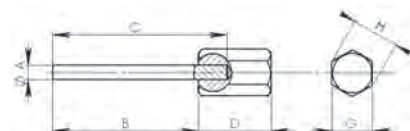


Measuring Pins



From 0.1 to 20 mm

A		B	C	D	G	H
From	To					
Ø 0.1	Ø 0.99	30	40	25	10	11,55
Ø 1	Ø 4	60	70	25	10	11,55
Ø 4.01	Ø 8	60	70	25	14	16,17
Ø 8.01	Ø 16	60	70	25	18	20,78
Ø 16.01	Ø 20	60	70	20	-	Ø 26



Availability

Stock is held in class 2 for : diameters 0,1mm to 20 mm in 0,01 mm increments.

For other qualities or dimensions : please contact us.

The reference standard

The standard applied for measuring pins is class 2 to NF E 11.017 : with tolerance of $\pm 1,5 \mu\text{m}$ on diameter.

We can provide other classes of tolerance or other lengths : please contact us.

Example of an order

Measuring pin Ø 2.

11

Boxed Measuring Pin Sets



A		B	C	D	G	H
From	To					
Ø 0.1	Ø 0.99	30	40	25	10	11,55
Ø 1	Ø 4	60	70	25	10	11,55
Ø 4.01	Ø 8	60	70	25	14	16,17
Ø 8.01	Ø 16	60	70	25	18	20,78
Ø 16.01	Ø 20	60	70	20	-	Ø 26

Availability

We will prepare the boxes according to your requirements.

Please contact us for the lead-time.

The reference standard

The standard applied for boxed measuring pins is class 2 to NF E 11.017 : with tolerance of $\pm 1,5 \mu\text{m}$ on diameter.

We can provide other classes of tolerance or other lengths : please contact us.

Example of an order

Box of measuring pins Ø 1 to Ø 1,99 in increments of 0,01 mm.

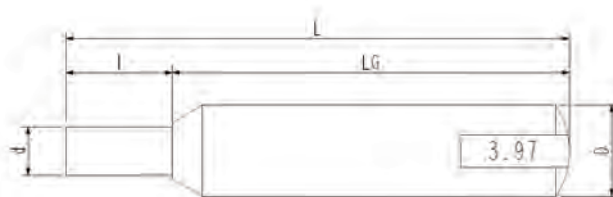


Measuring Pins

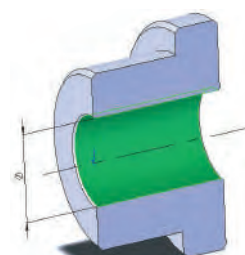
Short length Pins



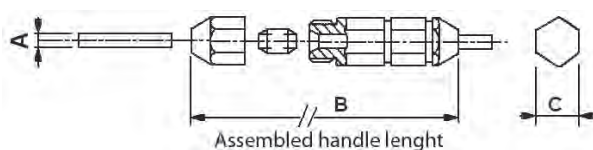
A Ø d		I	D	LG	L
Ø 0.10	Ø 0.30	2	4	32	34
Ø 0.30	Ø 0.50	3.5	4	32	35.5
Ø 0.5	Ø 1.00	5	4	32	37



Plug Gauge Holder with Reversible Pin Gauges



From 0.5 to 20 mm



A From To		B	C
Up to	Ø 1.90	55	7
Ø 1.90	Ø 4.57	65	10
Ø 4.57	Ø 7.14	75	14
Ø 7.14	Ø 10.31	85	17
Ø 10.31	Ø 12.95	105	20
Ø 12.95	Ø 16.26	110	24
Ø 16.26	Ø 19.30	110	28
Above Ø 19.30		130	32

Availability

Stock is held in class 2 for : diameters 0,5 mm to 12 mm in 0,01 mm increments.
For other qualities or dimensions : please contact us.

Advantages

This type of plug allows you to reverse the pin gauge as one end becomes worn, which effectively doubles the lifespan when compared to a normal plain plug gauge.
The measuring parts are interchangeable.

The reference standard

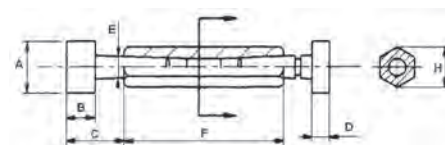
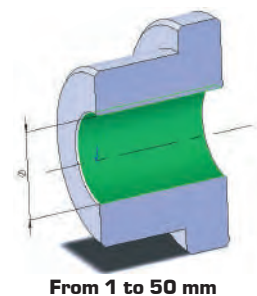
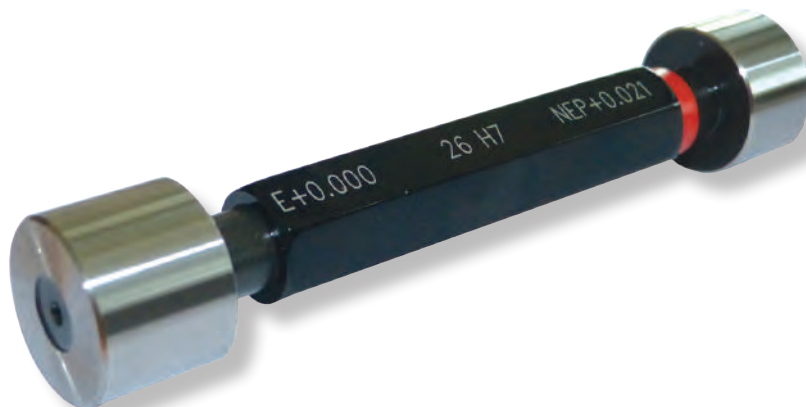
The standard applied for measuring pins is class 2 to NF E 11.017 : with tolerance of $\pm 1,5 \mu\text{m}$ on diameter.
We can provide other classes of tolerance or length : please contact us.

Example of an order

Reversible plug Ø 2 / Ø 2,20.



Plain Plug Gauges in Steel



A		B	C	D	E	F	H
From	to						
Ø 1	Ø 3	6,5	15	4	2,5	48	6,8
Ø 3	Ø 4	8	16	5	2,5	48	7,6
Ø 4	Ø 6	8	17	5	4	48	7,6
Ø 6	Ø 10	10	19	6,5	5,5	56	10
Ø 10	Ø 14	10	20	8	7	63	12,3
Ø 14	Ø 18	12	23	8	9	70	15,7
Ø 18	Ø 24	16	28	12	12	80	19,4
Ø 24	Ø 33	20	33	16	12	80	19,4
Ø 33	Ø 40	21	33	16	16	90	26,7
Ø 40	Ø 50	25	42	20	16	90	26,7

Availability

H7 : Material available in stock in 1 mm increments.

Other qualities or dimensions : Lead-time is from 1 to 2 weeks.

The reference standard

Unless otherwise specified, the tolerances of manufacture are in accordance with NF E 02.202.

It is also possible to produce in accordance with NF E 02.205, NF E 11.017, if required.

Options

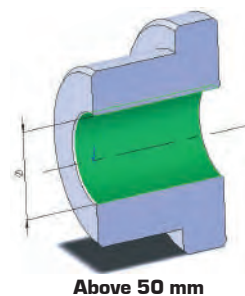
See page 50, for special form options.

Example of an order

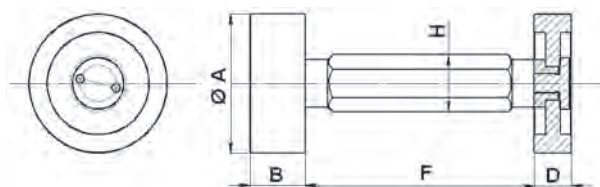
Double ended plain plug Ø 10 H7.

GO plain plug Ø 22,5 ± 0,05.

Plain Plug Gauges in Steel



A		B	D	F	H
From	To				
Ø 50	Ø 75	30	20	124	30,8
Greater than Ø 75 mm		30	20	124	30,8



Availability

H7 : Material available in stock of 1mm increments up to 70 mm and then in 5 mm increments from 75 mm to 100 mm.
Other qualities or dimensions: Lead-time is from 2 to 3 weeks.

The reference standard

Unless otherwise specified, the tolerances of manufacture are in accordance with NF E 02.202.
It is also possible to produce in accordance with NF E 02.205, NF E 11.017, if required.

Options

The larger sizes of plain plug gauges are heavy therefore for plug gauges greater than 100 mm we would propose an alternative type of "GO/NOGO" gauge.

We recommend gauge type flat plain plugs for diameters greater than 150 mm (see page 17).

Special features

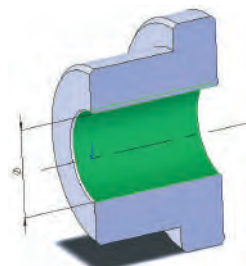
See page 50, for all form options.

Example of an order

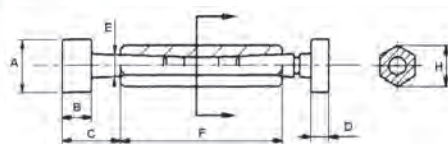
Double ended plain plug Ø 80 H9.



Plain Plug Gauges in Carbide



From 1 mm

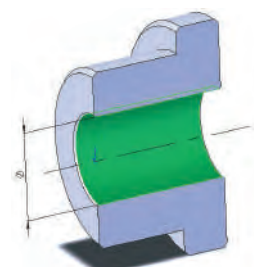


Options

The plug gauges that are all carbide or have carbide “GO” end with steel “NOGO” end are always delivered with blue handles to distinguish them from the steel plugs.

The gauges produced in carbide up to and including 20 mm are from solid cast carbide. The gauges above diameter 20 mm are with steel cores and carbide rings.

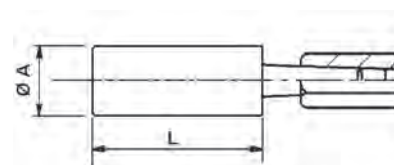
Special lengths



Special lengths

15

Diameters		Lenght L in mm					
From	To	16	21	26	31	41	56
Ø 1	Ø 20	X	X	X	X	X	X
Ø 21	Ø 28						X
Ø 28	Ø 30					X	X
Other lengths at your request							



Use

To allow the control of a diameter over it's full depth of manufacture.

This is especially useful on the “GO” gauge to check for any error in straightness of the bore.

Availability

Sizes from the table above have a 2 weeks lead-time.

For all other lengths or diameters the lead-time is 4 weeks.

The reference standard

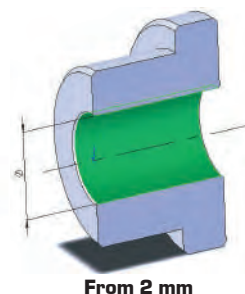
The gauges are produced in accordance to the standard of plain plug gauges.

Example of an order

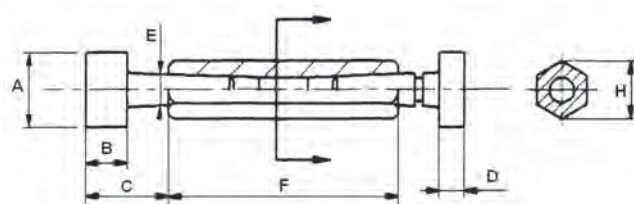
Double ended plain plug gauge Ø 10 H7 with length of the “GO” end at 55 mm “NOGO” end as per standard length.



Polygonal and Torx Plain Plug Gauges



From 2 mm



General dimensions

The dimensions B, C and D are identical to those given in tables on page 13 for the steel plain plug gauges.

16

Availability

Please contact us.

The reference standard

Unless otherwise specified, the tolerances of manufacture are in accordance with NF IN ISO 23429 (for six sides).

It is also possible to produce in accordance with NF E 02.202, if required.

Example of order

Double ended hexagonal plain plug gauge with “GO” and “NOGO” at 10 mm.

Torx gauges, Hexagonal plug gauges

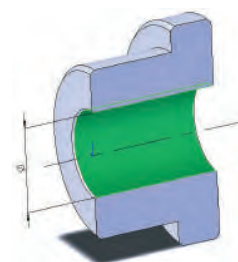
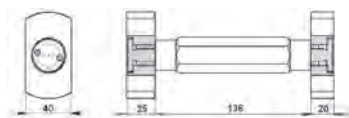


Master ring gauge for the control of Torx ® profile to customer specifications.



Plug gauge T25 to standard NF EN ISO 10664.

Flat Plain Plugs Gauges



From 75 mm

Use

The larger sizes of plain plug gauges are heavy so we would therefore recommend this type of gauge for plug gauges greater than 100 mm. The gauge is effectively a cylindrical gauge with the sides machined off in order to allow the correct control of bores while minimizing the weight.

Availability

Lead-time is 6 weeks for manufacture.

The reference standard

Unless otherwise specified, the tolerances of manufacture are in accordance with NF E 02.202.

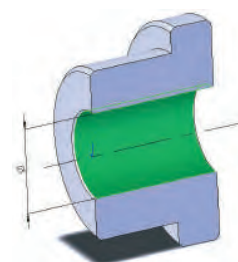
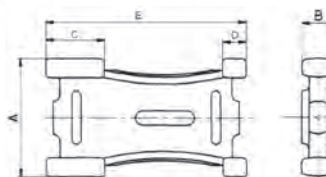
It is also possible to produce in accordance with customer requirements.

Example of an order

Double ended flat plug gauge $\varnothing 205$ 0/+0,2.

GO single ended flat plug gauge $\varnothing 150$ H8.

From	A to	B	C	D	E
$\varnothing 10$	$\varnothing 16$	6	14	9	50
$\varnothing 16$	$\varnothing 22$	7	15	10	60
$\varnothing 22$	$\varnothing 28$	7	17	12	80
$\varnothing 28$	$\varnothing 36$	8	17	12	80
$\varnothing 36$	$\varnothing 45$	10	23	18	100
$\varnothing 45$	$\varnothing 55$	12	28	18	115
$\varnothing 55$	$\varnothing 70$	13	34	23	136
$\varnothing 70$	$\varnothing 86$	15	35	23	155
$\varnothing 86$	$\varnothing 100$	16	36	25	168
Others \varnothing	On demand				



From 10 to 100 mm

17

Use

This is a useful gauge up to a limit of $\varnothing 100$ mm, above this size we recommend the double ended flat plug gauge page 18 (unless specifically requested by the customer).

Availability

Lead-time is 6 weeks for manufacture.

The reference standard

The gauges are produced in accordance to the tolerances of standard NF E 02.202.

It is also possible to produce in accordance with customer requirements.

Options

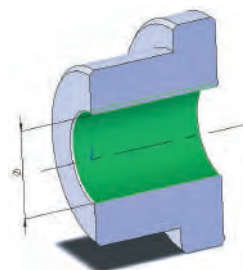
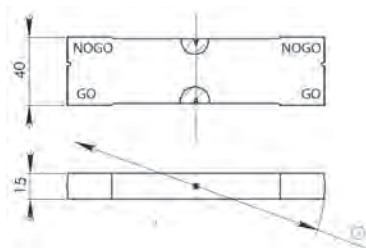
It is possible to order this gauge with the gauge points in Carbide : please contact us to discuss.

Example of an order

Double ended flat plug gauge for $\varnothing 68$ H7.



Double Ended Flat Plug Gauges



Above 100 mm

Use

This is a useful gauge to check above \varnothing 100 mm and for when the bore is not very deep.

Options

Below a diameter of 100 mm, we recommend the use of the double ended flat plug gauge (unless specifically requested by the customer).

Availability

6 weeks lead-time for manufacture.

The reference standard

The gauges are produced in accordance to the tolerances of standard NF E 02.202.

It is also possible to produce in accordance with customer requirements.

Example of an order

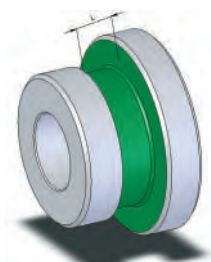
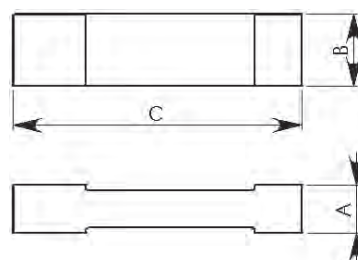
Double ended flat gauge \varnothing 260 H9.

18

Parallel Face Flat Gauge for Undercuts



A		B	C
From	to		
2	5	10	60
5	15	15	60
15	30	15	60
30	63	15	60



From 2 to 63 mm

Availability

Lead-time is 6 weeks lead-time for manufacture.

The reference standard

The gauges are produced in accordance to the tolerances of standard NF E 02.202.

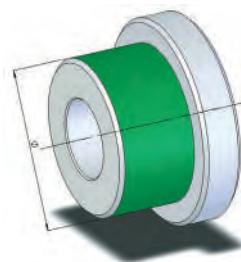
It is also possible to produce in accordance with customer requirements.

Example of an order

Parallel face flat gauge \varnothing 5 H7.



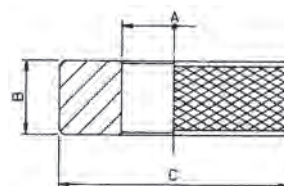
Plain Ring Gauges



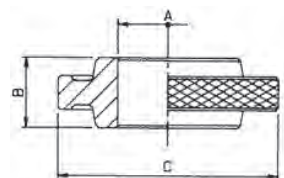
From 10 to 100 mm

A		B	C
From	to	mini	
Ø 1	Ø 2.5	4	22
Ø 2.5	Ø 5	5	22
Ø 5	Ø 10	8	32
Ø 10	Ø 15	10	38
Ø 15	Ø 20	12	45
Ø 20	Ø 25	14	53
Ø 25	Ø 32	16	63
Ø 32	Ø 40	18	71
Ø 40	Ø 50	20	85
Ø 50	Ø 60	20	100

A		B	C
From	to	mini	
Ø 60	Ø 70	24	112
Ø 70	Ø 80	24	125
Ø 80	Ø 90	24	140
Ø 90	Ø 100	24	160
Ø 100	Ø 110	28	170
Ø 110	Ø 120	28	180
Ø 120	Ø 130	28	190
Ø 130	Ø 140	28	200
Ø 140	Ø 150	28	212
Ø 150	Ø 160	28	224



Form for $A \leq 100$ mm



Form for $A > 100$ mm

Details

Unless otherwise specified, both the “GO” and “NOGO” ring gauges have the same dimensions B and C.
We can manufacture, at your request the “NOGO” ring not in accordance to standard NF E 11.030.

Availability

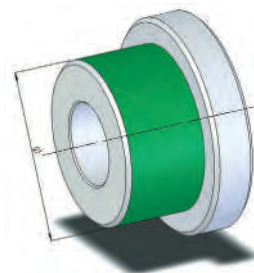
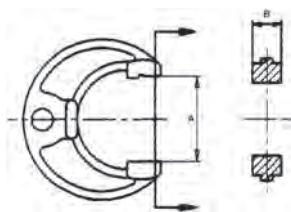
Lead-time is 4 weeks for ring gauges up to diameter 35.
Lead-time is 6 to 8 weeks lead-time for ring gauges above diameter 35.

The reference standard

Unless otherwise specified, the gauges are produced in accordance to the tolerances of standard NF E 02.202.
It is also possible to produce in accordance with standards NF E 02.205, NF E 11.011 (see standards) or customer specifications.

Example of an order

GO ring gauge Ø 68 h7
NOGO ring gauge Ø 22 -0,05/+0,05.



From 3 to 200 mm

Availability

Lead-time is 4 weeks for the manufacture of snap gauges < 100mm.

Lead-time is 8 to 10 weeks for snap gauges of other dimensions.

The reference standard

The gauges are produced in accordance to the tolerances of standard NF E 02.202.

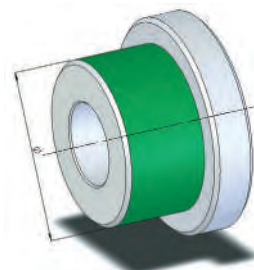
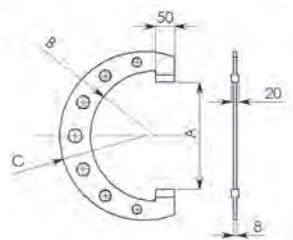
It is also possible to produce in accordance with standards NF E 02.205 or customer specifications.

Options

It is possible to order this gauge with the anvils in Carbide : please contact us to discuss.

Example of an order

Snap gauge $\varnothing 68$ h7.



From 175 mm

Availability

Lead-time is 10 to 12 weeks for manufacture.

The reference standard

Unless otherwise specified, the gauges are produced in accordance to the tolerances of standard NF E 02.202.

It is also possible to produce in accordance with customer specifications.

Options

It is possible to order this gauge with the anvils in Carbide : please contact us to discuss.

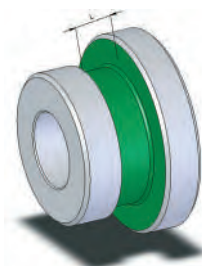
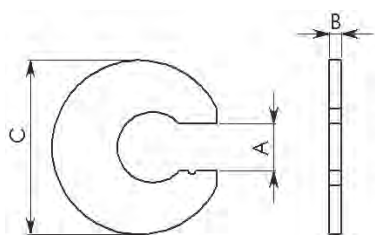
Example of an order

Snap gauge $\varnothing 450$ h7.





Slim Snap Gauges for Undercuts



From 3 to 800 mm

A		B
From	To	
Ø 3	Ø 18	3
Ø 18	Ø 70	4
Ø 70	Ø 100	5
Ø 100	Ø 130	5
Ø 130	Ø 150	6
Ø 150	Ø 200	6
Ø 200	Ø 250	6

A		B
From	To	
Ø 250	Ø 300	6
Ø 300	Ø 350	6
Ø 350	Ø 400	7
Ø 400	Ø 500	7
Ø 500	Ø 650	8
Ø 650	Ø 800	8

21

Type of anvils	A	B	C	D	F	G	H	I	J	K
Form or profile of anvils										

Options

It is possible to order this gauge with various anvils to perfectly meet your requirements.

Availability

Lead-time is 4 weeks for the manufacture of snap gauges < 50mm.

Lead-time is 8 to 10 weeks for other dimensions.

The reference standard

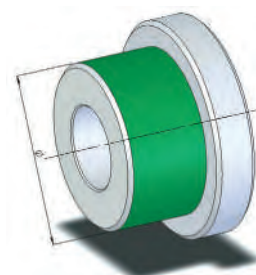
Unless otherwise specified, the gauges are produced in accordance to the tolerances of standard NF E 02.202.

It is also possible to produce in accordance with standards NF E 02.205 or customer specifications.

Example of an order

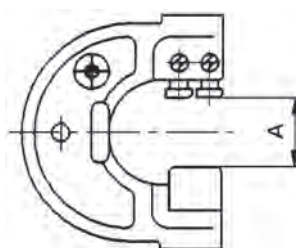
Snap gauge Ø 18 h9 with I type anvils.

Adjustable Snap Gauges

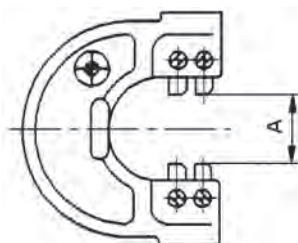


From 0 to 305 mm

CMRA	A	
	From	To
1	Ø 0	Ø 13
2	Ø 13	Ø 25
3	Ø 25	Ø 38
4	Ø 38	Ø 51
5	Ø 51	Ø 64
6	Ø 64	Ø 76
7	Ø 76	Ø 95
8	Ø 95	Ø 114
9	Ø 114	Ø 133
10	Ø 133	Ø 152
11	Ø 152	Ø 178
12	Ø 178	Ø 203
13	Ø 203	Ø 229
14	Ø 229	Ø 254
15	Ø 254	Ø 279
16	Ø 279	Ø 305



CMRC



CMRA

CMRC	A	
	From	to
1	Ø 0	Ø 6
2	Ø 6	Ø 13
3	Ø 13	Ø 19
4	Ø 19	Ø 26
5	Ø 26	Ø 32
6	Ø 32	Ø 38
7	Ø 38	Ø 44
8	Ø 44	Ø 51
9	Ø 51	Ø 57
10	Ø 57	Ø 64
11	Ø 64	Ø 70
12	Ø 70	Ø 78
13	Ø 78	Ø 87
14	Ø 87	Ø 97
15	Ø 97	Ø 106
16	Ø 106	Ø 117
17	Ø 117	Ø 125
18	Ø 125	Ø 135
19	Ø 135	Ø 144
20	Ø 144	Ø 155
Possible up to		Ø 295

Availability

Lead-time is 2 weeks.

The reference standard

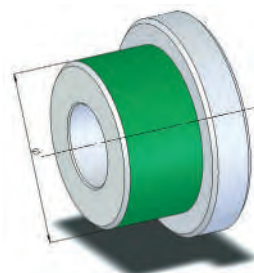
The gauges are supplied and are set to the dimensions by the customer.

Example of an order

CMRA 25-38 : Adjustable snap gauge with cylindrical pins to check a range between 25 and 38 mm.

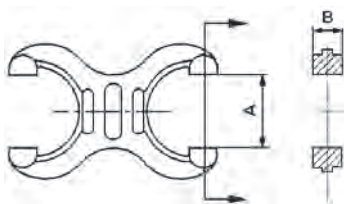


Doubled Ended Snap Gauges



From 3 to 100 mm

A		B
From	to	
Ø 3	Ø 6	6,5
Ø 6	Ø 10	7,5
Ø 10	Ø 14	7,5
Ø 14	Ø 18	8
Ø 18	Ø 21	8
Ø 21	Ø 27	8
Ø 27	Ø 32	9
Ø 32	Ø 38	9
Ø 38	Ø 43	10



A		B
From	to	
Ø 43	Ø 49	10
Ø 49	Ø 56	10
Ø 56	Ø 63	11,5
Ø 63	Ø 70	11,5
Ø 70	Ø 77	12
Ø 77	Ø 84	15
Ø 84	Ø 92	15
Ø 92	Ø 100	15

Availability

Lead-time is 5 weeks.

The reference standard

Unless otherwise specified, the gauges are produced in accordance to the tolerances of standard NF E 02.202.

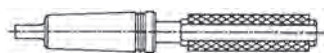
It is also possible to produce in accordance with standards NF E 02.205 or customer specifications.

Example of an order

Double ended snap gauge Ø 68 h7.



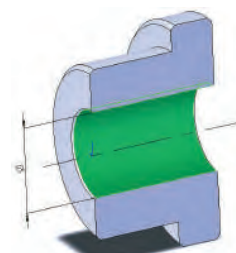
Morse Taper Plug and Ring Gauges



With tang



Without tang



Morse taper

Type of taper : from 1 to 6

Availability

Available by special order only, please contact us for lead-time.

The reference standard

The gauges are produced in accordance with DIN 229 for the Morse taper without tang.

The gauges are produced in accordance with DIN 230 for the Morse taper with tang.

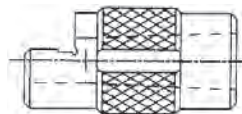
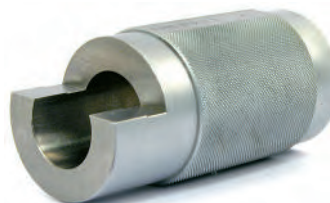
Example of an order

Morse taper plug gauge without tang for Morse taper 2.

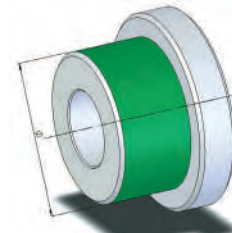
Morse taper plug gauge with tang for Morse taper 3.



Without tang



With tang



Morse taper

Type of taper : from 1 to 6

Availability

Available by special order only, please contact us for lead-time.

The reference standard

The gauges are produced in accordance with DIN 229 for the Morse taper without tang.

The gauges are produced in accordance with DIN 230 for the Morse taper with tang.

Example of an order

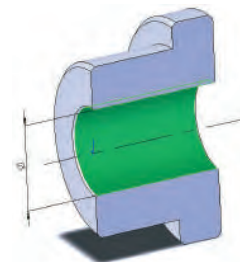
Morse taper ring gauge without tang for Morse taper 2.

Morse taper ring gauge with tang for Morse taper 3.

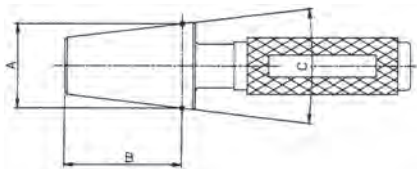




ISO Taper Plug and Ring Gauges



ISO taper



Type of ISO taper	A	B	C
30	31,750	47,600	16°35'40"
40	44,450	65,600	16°35'40"
45	57,150	85,000	16°35'40"
50	69,850	101,600	16°35'40"
55	88,900	132,000	16°35'40"
60	107,950	161,900	16°35'40"

Availability

Available by special order only, please contact us for lead-time.

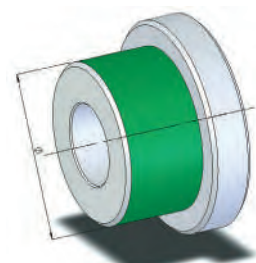
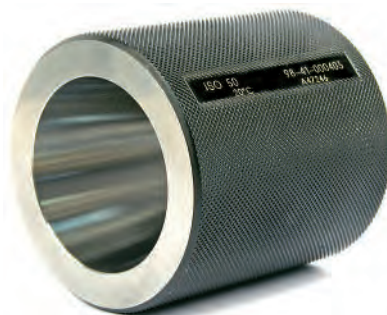
The reference standard

The gauges are produced in accordance to Gauge Pro's own standard.

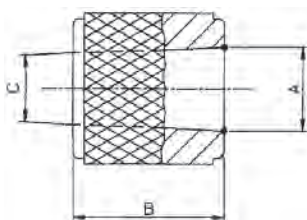
Example of an order

Taper plug gauge for ISO taper No 30.

25



ISO taper



Type of ISO taper	A	B	C
30	31,750	47,600	16°35'40"
40	44,450	65,600	16°35'40"
45	57,150	85,000	16°35'40"
50	69,850	101,600	16°35'40"
55	88,900	132,000	16°35'40"
60	107,950	161,900	16°35'40"

Availability

Available by special order only, please contact us for lead-time.

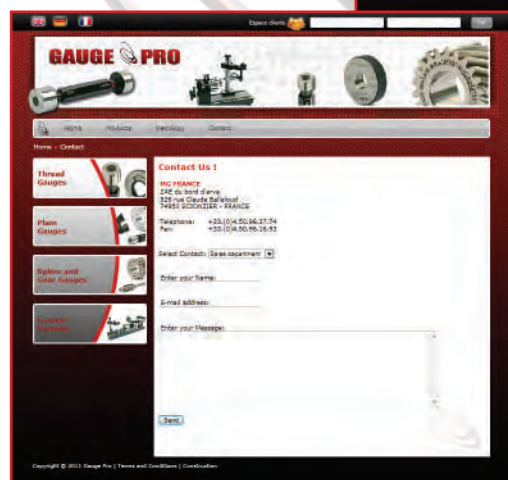
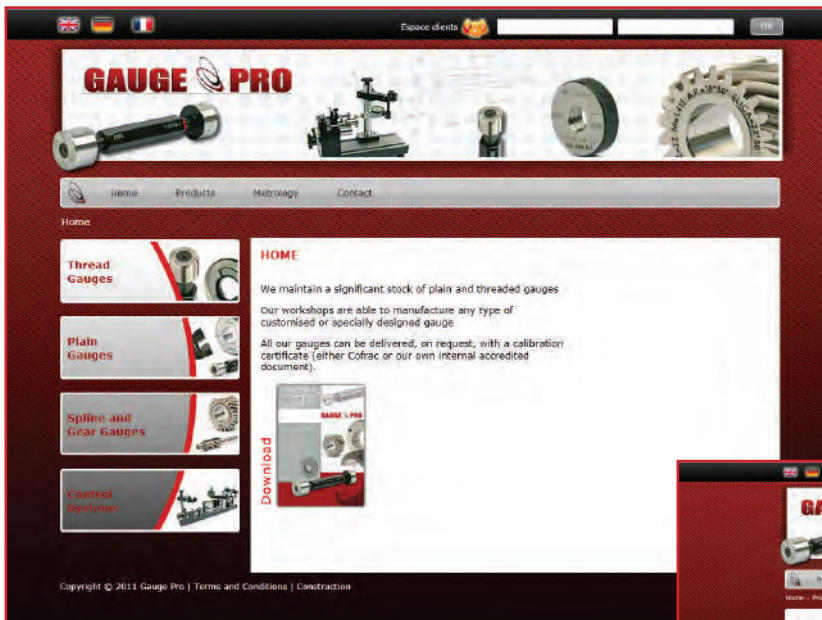
The reference standard

The gauges are produced in accordance to Gauge Pro's own standard.

Example of an order

Taper ring gauge for ISO taper No 30.

For further information, visit our website at
www.gauge-pro.com



- Find all our items online
- Login in and request a quotation
- Contact us : sales@gauge-pro.com

GAUGES FOR INSPECTION OF THREADS

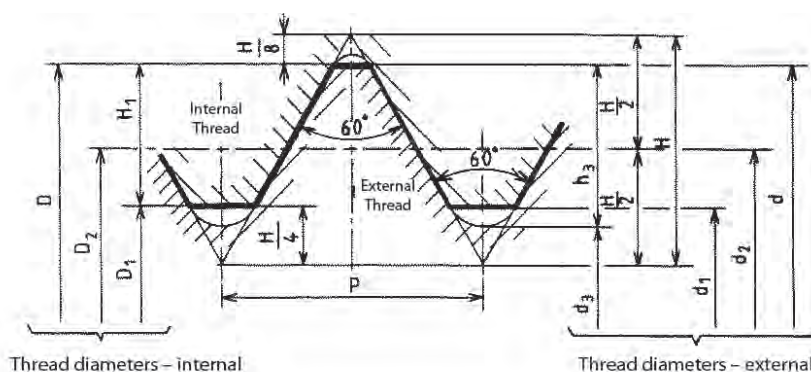


27





Metric Threads with 60° Thread Angles : « M »



Thread diameters – internal

Thread diameters – external

The reference standard

The gauges are used to check parts produced to NF ISO 965-1, NF ISO 965-2, NF ISO 965-3.

The gauges are produced in accordance to NF ISO 1502.

Standard tolerance ranges

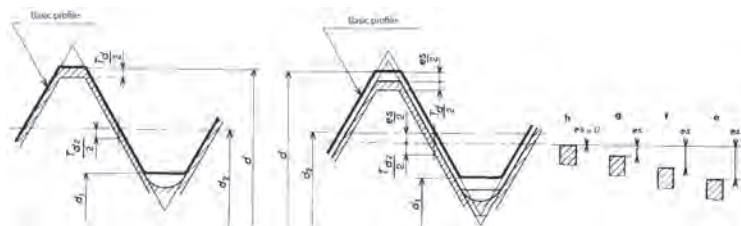
External thread :

Diameter tolerances : **3-4-5-6-7-8-9**

Fit tolerances : **h-g-f-e**

Variations : **d-c-b-a (DIN13)**

Example : **M6x100-6e**

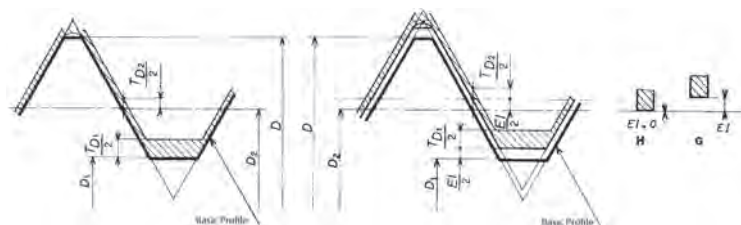


Internal thread :

Diameter tolerances : **4-5-6-7-8**

Fit tolerances : **H-G**

Example : **M6x1.00-6H**



General assembly condition for screw/nut recommendation : **6H/6g**

For specifications with 2 classes of fit tolerance, for example 4H 5H or 4h 6h, the first class indicates the effective diameter and the other is the outer diameter :

Example : Screw of **M5x0.8-4h 6h**

- **4h** : indicates the class of tolerance of the effective diameter (d2).
- **6h** : indicate the class of tolerance of the outer diameter (d).



Control of Internal thread

GO threaded plug gauge (with complete profile).

- This gauge checks the minimum limit of the effective diameter (D2).
- This gauge checks the minimum limit of the diameter at the thread root (major diameter D).
- It also checks the function (angles and pitch).

NOGO threaded plug gauge (profile with shortened crests) :

- This gauge checks only the maximum limit of the effective diameter (D2).

The minor diameter (D1) must be controlled independently by a double ended plain plug "GO/NOGO" gauge (see page 13) or another means.

Control of the screw

GO threaded Ring gauge (complete profile)

- This gauge checks the maximum limit of the effective diameter (d2).
- This gauge checks the maximum limit of the minor diameter (d1)..
- It also controls the function (angles and pitch).

NOGO threaded Ring gauge (profile with shortened crests)

- This gauge checks only the minimum limit of the effective diameter (d2).

The external diameter of the screw (d) must be controlled independently by 1 set of plain ring "GO/NOGO" gauges (see page 19) or another means.

Control of the threaded gauges

For the control of the threaded ring gauges the standard envisages a "GO" threaded check plug and a "NOGO" threaded check plug for the new gauges as well as a WEAR check plug for gauges that have already been in use.

Example of designation for order :

- **GO threaded check plug gauge for "GO" threaded Ring gauge M6x1.00-6g.**
- **NOGO threaded check plug gauge for "GO" threaded Ring gauge M6x1.00-6g.**
- **Wear threaded check plug gauge for "GO" threaded Ring gauge M6x1.00-6g.**

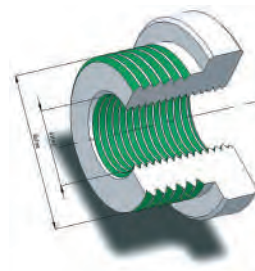
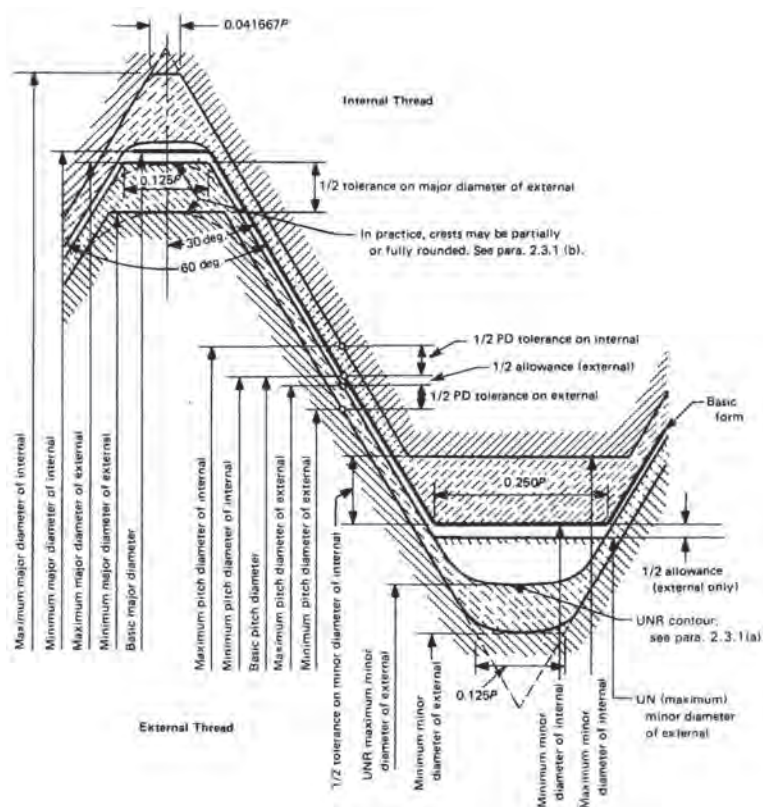
For the control of the threaded plug gauges the standard does not envisage a particular gauge. We can nevertheless apply the same system with rings "GO / NOGO" and WEAR.

Example of designation for order

- **GO threaded check ring gauge for "GO" Threaded plug gauge M8x1.25-6H.**



American Threads with 60° Thread Angles : « UN »



The reference standard

The gauges are used to control parts produced to **ANSI/ASME B.1.1** or **BS 1580**.

The gauges are produced in accordance with **ANSI/ASME B.1.2** or **BS 919**.

Standard tolerance ranges

External thread :

Diameter tolerances : **1A - 2A - 3A**.

Example : **1/4 - 28 UNF 2A**.

Internal thread :

Diameter tolerances : **1B - 2B - 3B**.

Example : **1/4 - 28 UNF 3B**.

Types of thread covered : **UNC - UNF - UNEF - UNS - UN**.

Standards for the manufacture of gauges with designation «UN»

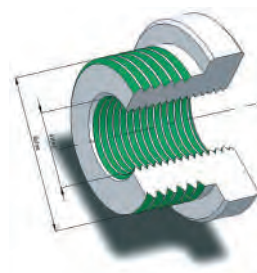
Unless otherwise specified, we normally stock gauges with a "UN" profile to the American standard **ANSI/ASME B.1.2**.

On request, we can manufacture and supply them according to the English standard **BS 919** part 1.

Please note that these two standards apply to the control of the same threads but the gauges have different tolerances as indicated in figures 1 & 2 of the following page. However, you can use the gauges according to one or the other of these standards to control this type of thread.



American Threads with 60° Thread Angles : « UN »



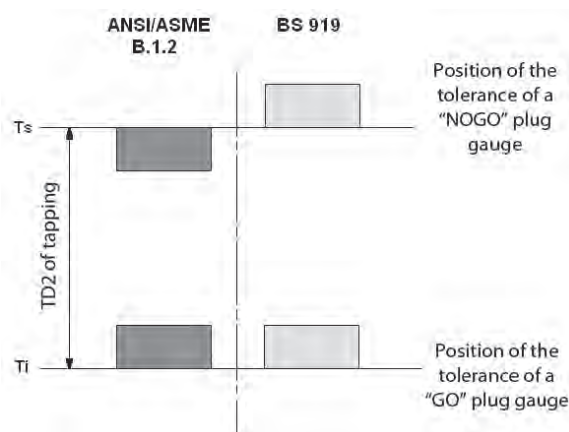
Control of internal threads

GO threaded plug gauge (with complete profile) :

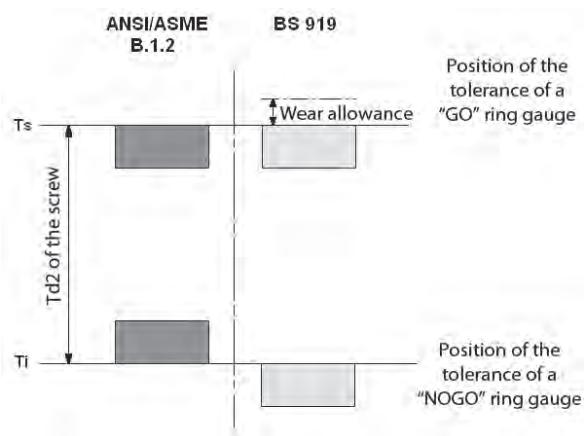
- This gauge checks the minimum limit of the effective diameter (D2).
- This gauge checks the minimum limit of the major diameter (D).
- It also checks the function (angles and pitch).

NOGO threaded plug gauge (profile with shortened crests) :

- This gauge checks only the maximum limit of the effective diameter (D2).
- The minor diameter (D1) must be controlled independently by a double ended plain plug "GO/NOGO" gauge (see page 13) or another means.



31



Control of the screw

GO threaded Ring gauge (complete profile)

- This gauge checks the maximum limit of the effective diameter (d2).
 - This gauge checks the maximum limit of the minor (d1).
- It also controls the function (angles and pitch).

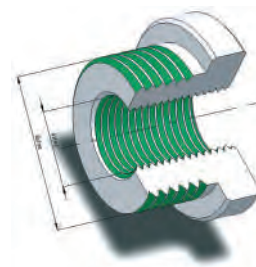
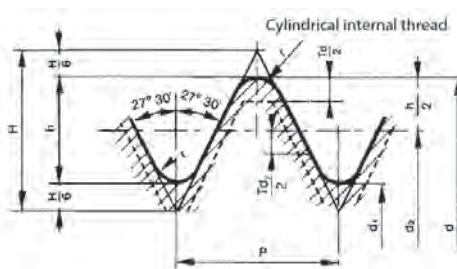
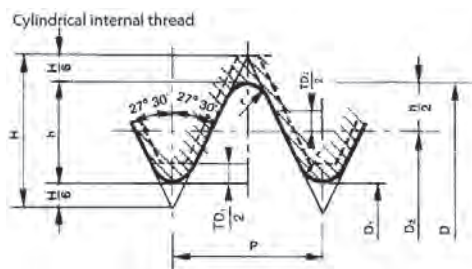
NOGO threaded Ring gauge (profile with shortened crests)

- This gauge checks only the mini limit of the effective diameter (d2).

The major diameter of the screw (d) must be controlled independently by 1 set of plain ring "GO/NOGO" gauges (see page 19) or another means.



"GAS" Threads (non sealing), type Whitworth 55°



The reference standard

The gauges are used to check parts produced to **NF EN ISO 228-1**.

The gauges are produced in accordance with **NF EN ISO 228-2**.

Standard tolerance ranges

External thread :

- Class of tolerance : **A or B**.
- Example : **G 1" 1/2 A**.

Internal thread :

- Class of tolerances : There is only one distinct class.
- Example : **G 1" 1/2**.

Checking of the internal thread

GO threaded plug gauge (with complete profile)

- This gauge checks the minimum limit of the effective diameter (D2).
- This gauge checks the minimum limit of the major diameter (D).
- It checks also the functionality (angles and pitch).

NOGO threaded plug gauge (thread form but with shortened crests)

- This gauge checks only the maximum limit of the effective diameter (D2).

The thread minor diameter of the tapping (D1) must be controlled separately by double ended plain "GO / NOGO" plug gauges (see page 13) or another means.

Checking of the external thread

GO threaded ring gauge (with complete profile)

- This gauge checks the maximum limit of the effective diameter (d2).
- This gauge checks the maximum limit of the minor diameter (d1).
- It checks also the functionality (angles and pitch).

NOGO threaded ring gauge (thread form but with shortened crests)

- This gauge checks only the minimum limit of the effective diameter (d2).

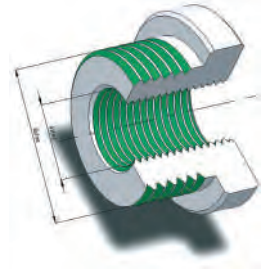
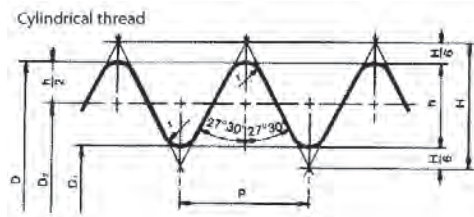
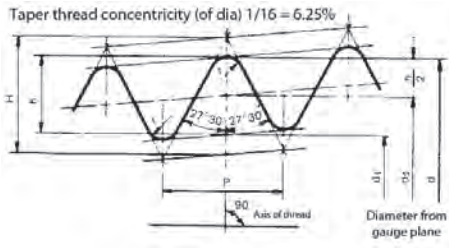
The major diameter of the screw (d) must be controlled separately by a pair of plain "GO" and "NOGO" ring gauges (see page 17) or another means.

Checking of thread gauges

A check gauge system of GO, NOGO and WEAR is used for the control of the threaded ring gauges.



"GAS" Threads (sealing), type Whitworth 55°



The reference standard

The gauges are used to check parts produced to **ISO 7-1 or NF EN 10226-1 & 2.**

The gauges are produced in accordance with **ISO 7-1 or NF EN 10226-3.**

Standard tolerance ranges

External thread :

- External Taper screw thread.
- Example : **1" 1/2 R.**

Internal thread :

- Internal cylindrical screw thread (Rp) or tapered (Rc).
- Example : **1" 1/2 Rc.**

Checking of the internal thread (NF EN 10226-3, iso 7-2)

Tapered thread plug gauge (with complete profile) with 2 heights.

- This gauge checks the minimum limit of the effective diameter (D2) on the gauge plane.
- This gauge checks the minimum limit of the major diameter (D) on the gauge plane.
- It checks also the functionality (angles and pitch).

Checking of the external thread (NF EN 10226-3, iso 7-2)

Cylindrical threaded ring gauge (with complete profile) with 2 heights .

- This gauge checks the maximum limit of the effective diameter (d2) on the gauge plane.
- This gauge checks the maximum limit of minor diameter (d1) on the gauge plane.
- It checks also the functionality (angles and pitch).

Plain taper ring

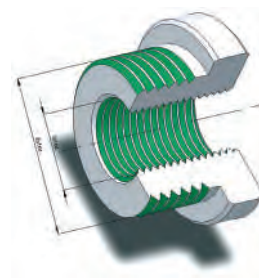
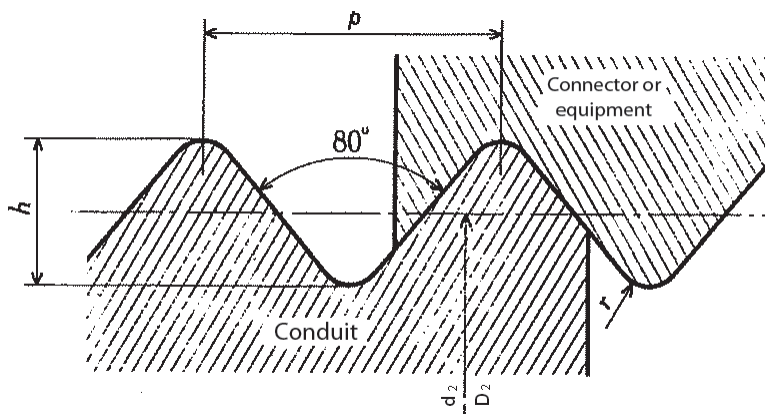
- This gauge checks the taper at the thread crest.
- This gauge checks the external diameter (d).
- It checks also the useful length of thread corresponding to the external taper threads.

Checking of thread gauges

It checks also the useful length of thread corresponding to the external taper threads.



Threaded Plug and Ring gauges for 80° Electrical Conduit "P6"



The reference standards used

In most cases the **DIN 40430** standard is used for this type of thread.

Our gauges are made in accordance with this German standard.

See also UTE 68.312 for information : it does not contain exactly the same values for threads but offers supporting information.

Standard tolerance ranges

There are no different classes of tolerance in **DIN 40430**.

The values of PG define dimensions for internal and external threads, they are shown in a table contained in the standard.

Checking of the internal thread

GO threaded plug gauge (with complete profile)

- This gauge checks the minimum limit of the effective diameter (D_2)
- This gauge checks the minimum limit of the major diameter (D)
- It checks also the functionality (angles and pitch).

NOGO plain plug gauge

- This gauge checks only the minimum limit of the minor diameter (D_1).

Checking of the external thread

GO threaded ring gauge (with complete profile)

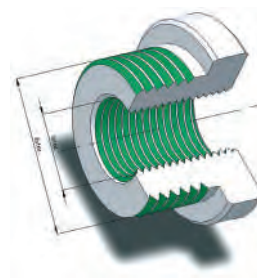
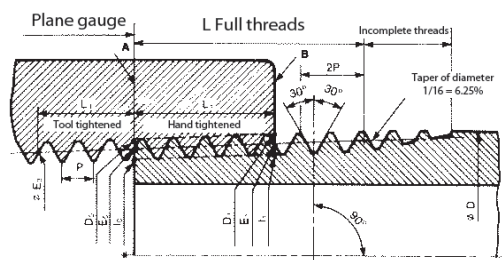
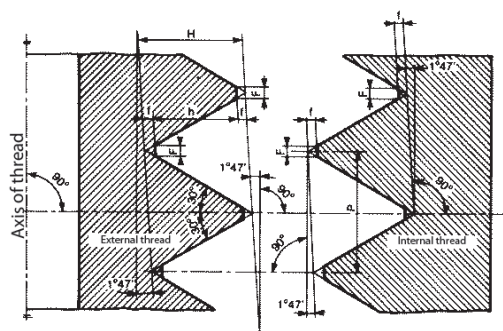
- This gauge checks the maximum limit of the effective diameter (d_2)
- This gauge checks the maximum limit of the minor diameter (d_1)
- It checks also the functionality (angles and pitch).

NOGO Plain ring gauge

- This gauge checks only the major diameter of the thread (d).



American Pipe Threads : NPT-NPTF



The reference standards used

The gauges and the parts produced are to ANSI B1.20.1 (Taper thread NPT) or the ANSI B1.20.3, ANSI B1.20.5 (Taper thread NPTF) standards. The gauges we stock are produced in accordance to these American standards.

Checking of the internal thread

Taper threaded plug gauge (with complete profile) 3 heights :

- This gauge checks the effective diameter (D2) on the gauge plane.
- This gauge checks the major diameter (D) on the gauge plane.
- This gauge checks the assembly length L1.
- It checks also the functionality (angles and pitch).

Checking of the external thread

Taper threaded ring gauge (with complete profile) 3 heights :

- This gauge checks the effective diameter (d2) on the gauge plane.
- This gauge checks the minor diameter (d1) on the gauge plane.
- This gauge checks the assembly length of L1.
- It checks also the functionality (angles and pitch).

Other American threads for pipes

Name of thread	Assembly type	Options
NPTR	Internal and external Taper	All non-tight assemblies (non dry-seal) ANSI B1.20.1
NPSC	Internal Cylindrical	
NPSH	Internal Cylindrical	
NPSM	Internal and external Taper	
NPSL	Internal and external Taper	
NPTF class 2	Internal and external Taper	All leak proof assemblies (dry-seal) ANSI B1.20.3 ANSI B1.20.5 (gauges)
NPSF	Internal Cylindrical	
NPSI	Internal Cylindrical	
PTF-SAE SHORT	Internal and external Taper	



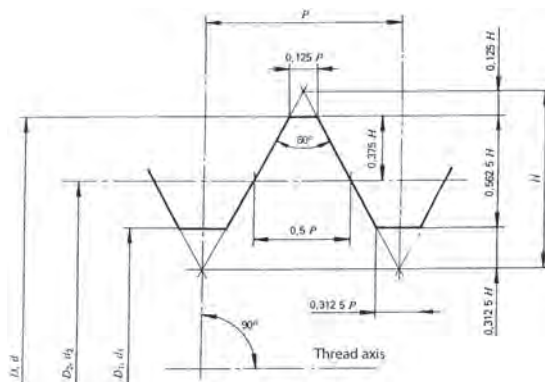
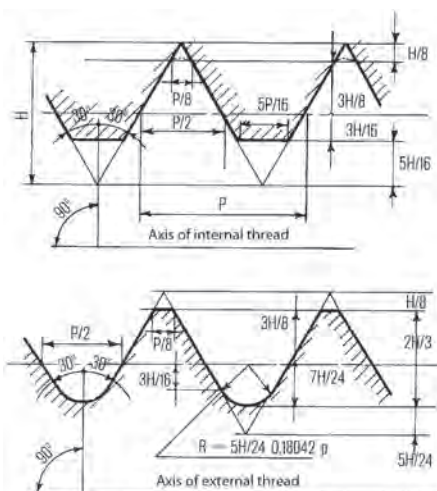
Other Threads : with a 60° Profile

Threads «MJ»

This type of thread is similar to thread profile "M" and is used in the field of aeronautics (standard ISO 5855-1 and ISO 5855-2).

It differs from a profile "M" by a truncation of the thread root to $5H/16$ instead of $H/4$ for thread "M".

Example of designation : MJ 5x0.8 4h 6h.



Threads «UNJ»

This type of thread is similar to thread profile "UN" and is used in the field of aeronautics (standard BS 4084 and AS8879).

It differs from a profile "UN" by a truncation of the thread root to $5H/16$ instead of $H/4$ for thread "UN".

Example of designation : 1/4 - 28 UNJF 2B.

Thread inserts such as «HELICOIL» or «FILTEC»

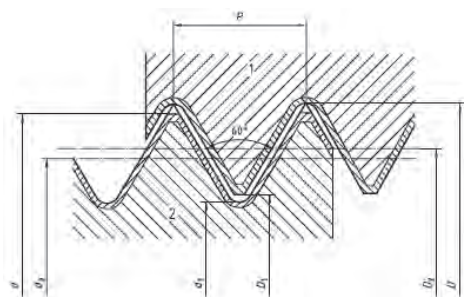
This type of thread is defined for thread inserts. They are pre-formed wires intended to be inserted into worn or damaged internal threads to increase their strength and function.

They are defined by the standards of the manufacturers (example: BOLLHOFF OTALU).

They are threads with a 60° profile "M" or "UN". The classes used are the following ones :

- Profile "M" : 4H or 5H.
- Profile "UN" : 2B or 3B.

Example of designation : M 6x1.00 5H HELICOIL.



Threading for valves of tires

This type of thread is defined by the standard ISO 4570.

This type of thread is the type found on the valves of vehicle tires for example.

Example of designation : 8V1 (7,7 X 0,794).

Other types of thread with a 60° profile

Profile "SI" : old profile "M". There is no class of tolerance indicated.

Profile "Sim" : Profile "SI" modified. There are three classes of tolerances II, III, IV.

Profile "M BNAE" following NF L 05.222 : Profile identical to the profile "M".

There are three classes of tolerances II, III, IV.



Other Threads : Trapezoidal Profile

Symmetrical trapezoidal threads 30°

Profiles of the threads are defined by standards **NF ISO 2901**, **NF ISO 2902**, **NF ISO 2903**, **NF ISO 2904**.

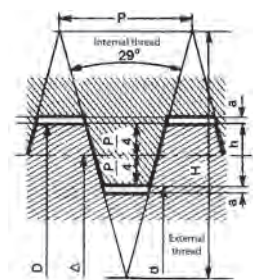
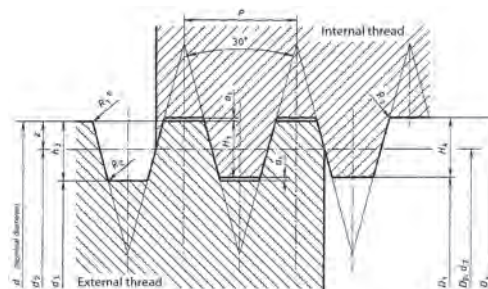
The gauges are defined by standards **NF E 03.619**, **NF E 03.620** and **NF E 03.621**.

The classes of tolerances envisaged are the following:

- External thread : Quality of tolerance : **7, 8, 9** - Variations : **e, c**.
- Internal thread : Quality of tolerance : **7, 8, 9** - Variations : **H**

The most traditional mating is : **7H / 7e**.

Example of designation : **Tr 40 X 7 – 7H / 7e**.



Symmetrical trapezoidal threads ACME 29°

Profiles for threads and gauges are defined by the American standard **ANSI B1.5**

For general use, 4 classes of tolerance are applied :

- **2G, 3G, 4G, 5G.**

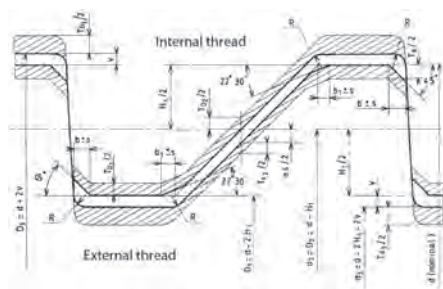
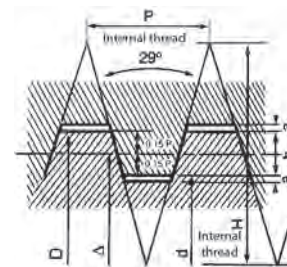
➤ For reduced levels of clearance, 5 classes are applied :

- **2C, 3C, 4C, 5C, 6C.**

Symmetrical trapezoidal threads STUB-ACME 29°

Profiles for threads and gauges are defined by the American standard **ANSI B1.8**.

Only one class of tolerance is used by the standard: it corresponds to a class 2G of the ACME profile.



Asymmetrical trapezoidal threads "ARTILLERY" (3°, 45°)

Profiles of the threads are defined by the standard **NF E 03.611**.

The gauges are defined by the standard **NF E 03.612**.

The classes of tolerances used are the following :

- **Internal thread** : 6 qualities (**5 to 10**) and 1 position **H**
- **External thread** : 6 qualities (**5 to 10**) and 5 positions **g, f, e, c, a**

Example of designation : **ART 40 X 3 – 8**

Other asymmetrical trapezoidal threads

Threads "**BUTTRESS THREAD**" (**7°/45°**, **3°/33°**, **5°/50°**,...) as defined by the American standard **ANSI B1.9** or the English standard **BS 1657**.

Threads "**S**" (Sägewinde) (**3°/30°**) as defined by the German standard **DIN 20401**.

Threads "**S**" (Sägewinde) (**3°/30°**) as defined by the German standard **DIN 513**.



Other Threads

Whitworth threads 55°

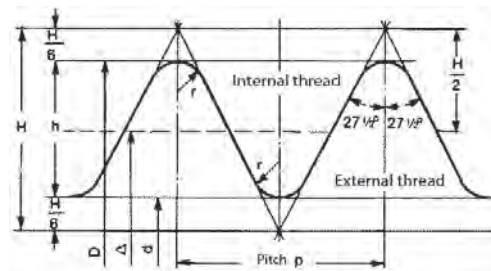
This type of thread is defined by the English standard **BS 84**.

Two series are used : **BSW and BSF**.

The classes of tolerances used are the following :

- **External thread : CLOSE CLASS, MEDIUM CLASS, FINE CLASS.**
- **Internal thread : MEDIUM CLASS, NORMAL CLASS.**

Example of designation : **1 "3/8 BSW MEDIUM CLASS.**



Threads "BA"

This type of thread is a thread with round thread forms as defined by the English standard **BS 93**.

The gauges are defined by the standard **BS919 part 2**.

The classes of tolerances used are the following :

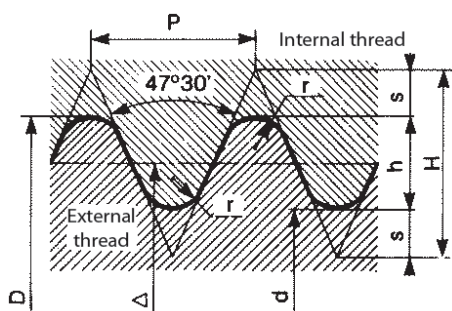
- **External thread :**

CLOSE CLASS for n° 0 to 10 without initial play,

NORMAL CLASS for n° 0 to 10 with or without initial play and 11 to 16 without initial play.

- **Internal thread : only one class used.**

Example of designation : **Course N° 8 BA class.**



Threads with round profiles

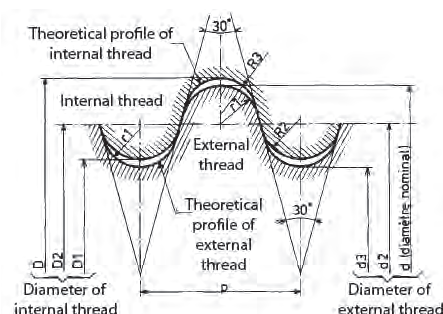
This type of thread is defined by the standards **NF F 00.016 / NF F 00.032** or the German standard **DIN 405**.

Gauges used for the control of threads are according to the standard **NF F 00.016** and are defined by the standard **NF F 00.017**.

This type of thread is used in the railway industry.

Three qualities of adjustments are given by the standards defining dimensions of the screw and tapping : **"Without clearance"**, **"With average clearance"**, **"With a lot of clearance"**.

Example of designation : **Rd 20 X 3 with average clearance.**



This list of threads is not exhaustive : it refers simply to threads that are the most frequently requested. We can produce other types of threads defined by other standards or to customer specifications.



THE CHECKING OF SPLINES AND GEARS





Materials used

See the materials used for plain gauges.

For gear gauges, material such as ASP23 or S600 can be used. The material ASP23 is a composite material whose properties allow optimized hardness as well as reduced friction thus generally reducing wear.

This hardness can be improved further by the use of surface coatings allowing us to reach a surface hardness of 3700 HV. This point is explained further in the chapter "the special gauges".

Each type of material imparts in the gauges special properties according to their use. It is therefore necessary to give us the maximum information on the use (in laboratory, workshop...) in order for us to offer you the most suitable product.

Different types of Splines

Splines are used for the transmission of force in rotating assemblies while assuring a strong connection.

There are 3 types of spline :

Splines with sides in involutes : following the standards NF E 22.141/NF E 22.144/NF E 22.145, DIN 5480/ANSI B 92.1...

Parallel splines : NF E norm's 22.131...

Linear splines : with norm's 5481...

Generally, the "GO" part of the splined gauges has a complete profile while the "NOGO" part has a reduced profile containing only a few teeth. There is a possibility of using elementary gauges (plain plug, flat gauge...) for the checking of NOGO but they do not check each tooth.

Master Gear

The master gears are masters with an excellent geometry allowing you to simulate mating, on control machines, with the products manufactured.

These machines will make it possible to deduce a false round, the radial error, the radial jump of the tooth and distances between centres.

Characteristics of this type of material

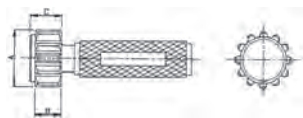
Spline gauges or master gears are very technical products utilizing many characteristics and various complex standards.

For this reason, we submit before starting gauge production, a drawing with the various characteristics and requirements of the gauges or setting gauges.

The acceptance of the drawing by the customer makes it possible to confirm that the intent of the drawing meets the needs of the customer and at an early enough stage so as to identify any potential problems with the interpretation of the standards.

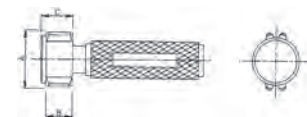


Control of Splines



GO plug

A		B	C
From	to		
Up to	8 mm	6	10
Ø 8	Ø 12	8	12
Ø 12	Ø 18	12	17
Ø 18	Ø 28	16	21
Ø 28	Ø 38	22	27
Ø 38	Ø 48	28	36
Ø 48	Ø 70	30	38
Ø 70	Ø 120	40	48
Ø 120	Ø 220	50	58



NOGO plug

A		B	C
From	to		
Up to	8 mm	4	8
Ø 8	Ø 12	6	10
Ø 12	Ø 18	8	13
Ø 18	Ø 28	10	15
Ø 28	Ø 38	12	18
Ø 38	Ø 48	14	22
Ø 48	Ø 70	15	23
Ø 70	Ø 120	20	28
Ø 120	Ø 220	25	33

Availability

Please contact us for manufacturing lead-time.

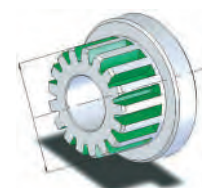
The reference standard

Unless otherwise specified, the tolerances of manufacture are in accordance with the standard NF ISO 4156 (parts 1, 2 and 3).

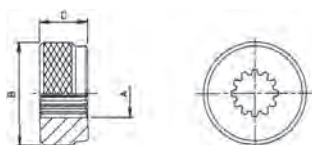
It is possible to produce to other DIN standards DIN5480, DIN 5482... or to customer specifications.

Example of order

GO spline plug gauge 24Z x 2,5 m x 30 R x 5 H NF ISO 4156.

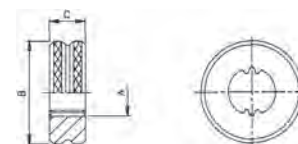


Up to 220 mm



GO ring

A		B	C
From	To		
Up to	12 mm	45	10
Ø 12	Ø 18	53	16
Ø 18	Ø 28	63	22
Ø 28	Ø 36	71	25
Ø 36	Ø 50	85	25
Ø 50	Ø 60	100	30
Ø 60	Ø 70	112	35
Ø 70	Ø 80	125	35
Ø 80	Ø 90	140	35
Ø 90	Ø 100	150	35
Ø 100	Ø 120	170	40
Ø 120	Ø 140	190	45
Ø 140	Ø 160	210	50
Ø 160	Ø 180	230	50
Ø 180	Ø 200	250	50
Ø 200	Ø 220	280	50



NOGO ring

A		B	C
From	To		
Up to	12 mm	45	8
Ø 12	Ø 18	53	11
Ø 18	Ø 28	63	14
Ø 28	Ø 36	71	16
Ø 36	Ø 50	85	16
Ø 50	Ø 60	100	20
Ø 60	Ø 70	112	20
Ø 70	Ø 80	125	23
Ø 80	Ø 90	140	23
Ø 90	Ø 100	150	23
Ø 100	Ø 120	170	25
Ø 120	Ø 140	190	25
Ø 140	Ø 160	210	30
Ø 160	Ø 180	230	30
Ø 180	Ø 200	250	30
Ø 200	Ø 220	280	30

Availability :

Please contact us for manufacturing lead-times.

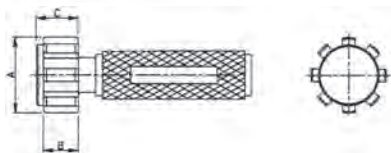
The reference standard

Unless otherwise specified, the tolerances of manufacture are in accordance with the standard NF ISO 4156 (parts 1, 2 and 3).

It is possible to produce to other DIN standards DIN5480, DIN 5482... or to customer specifications.

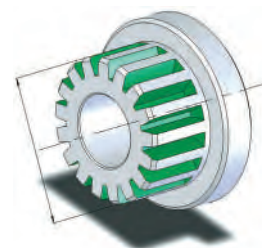
Example of order

GO spline ring gauge 24Z x 2,5 m x 30 P x 5 h NF ISO 4156.



60 plug gauge or N060 plug gauge

A		B	C
From	To		
Ø 14	Ø 19	20	24
Ø 20	Ø 24	25	29
Ø 25	Ø 31	31,5	35,5
Ø 32	Ø 35	40	45
Ø 36	Ø 45	45	50
Ø 46	Ø 49	50	55
Ø 50	Ø 67	50	56
Ø 68	Ø 87	50	58
Ø 88	Ø 111	50	60
Ø 112	Ø 125	56	66



Up to 125 mm

Availability

Please contact us for manufacturing lead-time.

The reference standard

Unless otherwise specified, the tolerances of manufacture are in accordance with the standard NF E 22.131.

It is possible to produce to other standards or to customer specifications.

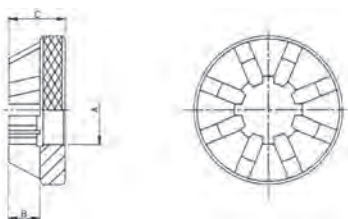
Separate control of teeth characteristics

In accordance with the standard NF E 22.131, the "NOGO" gauge is a basic inspection means.

We can, if required, produce "NOGO" gauges to check the complete part to be inspected.

Example of order

GO spline plug gauge 6 x 23 x 26 slide fit : A "GO" linear spline plug gauge where d = 23H7, D = 26H10, B = 6H11 in line with NF E 22.131.



60 plug gauge or N060 plug gauge

A		B	C
From	to		
Ø 14	Ø 19	10	20
Ø 20	Ø 24	10	20
Ø 25	Ø 31	12,5	25
Ø 32	Ø 35	14	28
Ø 36	Ø 45	18	35,5
Ø 46	Ø 49	22,4	45
Ø 50	Ø 67	25	50
Ø 68	Ø 87	28	56
Ø 88	Ø 111	31,5	63
Ø 112	Ø 125	35,5	71

Availability

Please contact us for manufacturing lead-times.

The reference standard

Unless otherwise specified, the tolerances of manufacture are in accordance with the standard NF E 22.131.

It is possible to produce to other standards or to customer specifications.

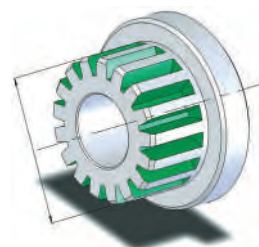
Separate control of teeth characteristics

In accordance with the standard NF E 22.131, the "NOGO" gauge is a basic inspection means.

We can, if required, produce "NOGO" gauges to check the complete part to be inspected.

Example of order

GO spline ring gauge 6 x 23 x 26 slide fit : A "GO" linear spline ring gauge where d = 23f7, D = 26a11, B = 6d10 in line with NF E 22.131.



Availability

Please contact us for manufacturing lead-times.

The reference standard

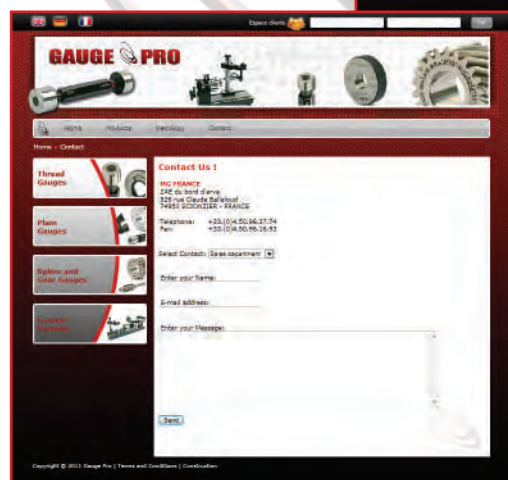
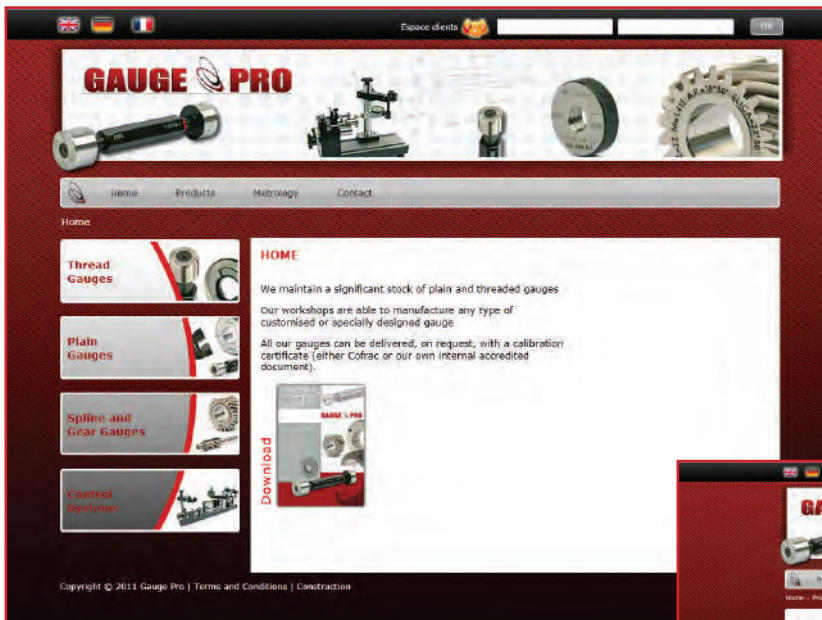
The reference standard depends on the product and gear requirement.

Please advise reference standard at time of order.

Example of order

Gear Master for : detail of teeth

For further information, visit our website at
www.gauge-pro.com



- Find all our items online
- Login in and request a quotation
- Contact us : sales@gauge-pro.com

SPECIAL GAUGES





Gauges mentioned in this brochure generally refer to standards which are commonly used and in the majority of cases, they refer to a basic control of characteristics but not to a complex combination of characteristics (plain and threaded for example). This section of the catalogue makes it possible to show specific applications or options for control gauges.

The effective control of parts, for example, is beneficial when the checking gauge controls the mating parts of an assembly not only to ensure they can assemble more accurately but also to visualize and “feel” the assembly and thus to have an idea of operation.

Reference marks on sides or ends can be added in order to check not only one dimension but also its depth or length.

More automated systems have driven us to manufacture special gauges or systems to be able to offer solutions for clamping of special features (squares, hexagons...), or with special chamfers with difficult entry, or for testing the couples of rupture and or other characteristics necessary for several functions.

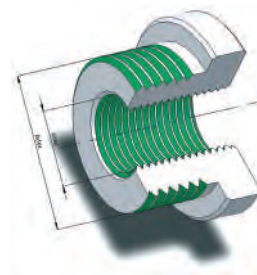
The surface hardness of the gauges and thus their lifespan can be improved by surface coatings. Applied in a thin layer (1 to 1,5 μm), they make it possible to reduce wear from constant contact with parts being checked and still maintain very tight tolerances on plain diameters, threads or teeth. Others coatings also allow an improvement of the ease of entry in the case of intensive use.

Generally, the range of gauges or precision mechanical devices allows you a range of complimentary accessories to the more sophisticated control machines such as 3D (CMM) machines. For example, they can help with the positioning of the parts to allow orientating or aligning of certain geometrical characteristics which can be difficult to fix.

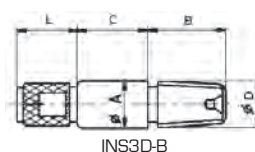
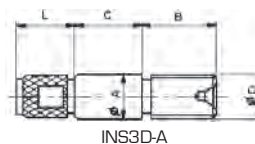




Control of Concentricity or Localization



Ø D	A	B	C	L
Ø 4	Ø 4	Pitch x 10	6	4
Ø 5	Ø 5	Pitch x 10	7.5	5
Ø 6	Ø 6	Pitch x 10	9	6
Ø 8	Ø 8	Pitch x 10	12	8
Ø 10	Ø 10	Pitch x 10	15	10
Ø 12	Ø 12	Pitch x 10	18	12



Application

These inserts are used to control the concentricity of a tapping compared to a diameter or the localization on 3D machine.

The insert is screwed in until it locks in the tapped hole: the base for the measurement is then taken from the ground section. Concentricity between ground section and the effective diameter of the threaded part is $< 5 \mu\text{m}$.

Locating on the thread is done on the sides of the thread either by differential pitch or "pitch shifted" (INS3D-A) or by a slightly tapered thread (INS3D-B).

Availability

Lead-time is 3 weeks for manufacture to the dimensional standards.

Other dimensions can be produced, please contact us for the lead-time.

The reference standards

Unless otherwise specified, the tolerances of manufacture are in accordance with the specific standards relating to the thread.

Example of order

INS3D-A for thread M8 x 1.25-6H : 3D Insert for M8 x 1.25-6H thread.

47



Application

These rings are used to control the concentricity of a thread compared to a diameter.

The ring is screwed on until it locks on the threaded diameter: the base for the measurement is then taken from the ground outside diameter. Concentricity between ground section and the effective diameter of the threaded gauge is $< 5 \mu\text{m}$.

Locating on the thread is done on the sides of the thread by differential pitch or "pitch shifted".

The tolerances of manufacture are in accordance with the specific standards relating to the "GO" ring gauges used for the external thread being checked.

Availability

Lead-time is 5 weeks for manufacture to the dimensional ring standards.

Other dimensions can be produced, please contact us for the lead-time.

The reference standards

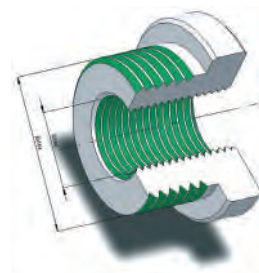
Unless otherwise specified, the tolerances of manufacture are in accordance with the specific standards relating to the thread.

Example of order

BFDC for thread M8 x 1.25-6h : Ring gauge for the control of concentricity of a M8 x 1.25-6H thread.



Checking for Effective Assembly



48

Application

In order to establish how effectively a male part will assemble or mate with a female part (or visa versa), it is sometimes necessary to have several features on the control gauge.

The checking can be done between plain sections and threaded parts by taking account of the geometrical tolerances defined on the product. Some examples are proposed to you in the photograph.

Availability

Please contact us for manufacturing lead-times.

The reference standards

This depends on the specifications of the parts to be checked. For this type of gauge production, if you do not have your own specification, we can work with you to propose a solution to your gauging needs.



Control of the Depth of an Internal Thread

Plug gauge with Flange

Plug gauge with rebate

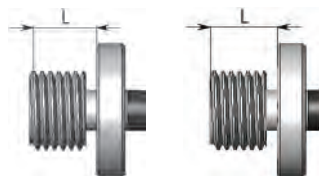
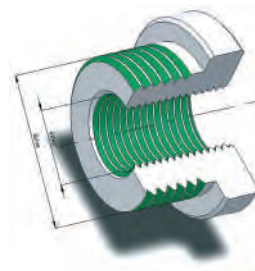


Fig. 1

Fig. 2

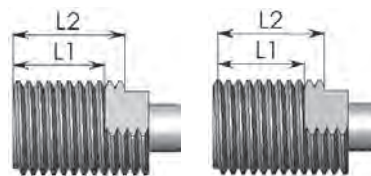


Fig. 3

Fig. 4

Application

This gauge allows for the simple check of minimum thread depth to see whether the length of minimum tapping (flange) or tolerance (reference marks L1 and L2) is reached confirming the Minimum and Maximum tolerance of the tapped hole.

For this type of product, it is necessary to correctly specify if the length to control is in line with the top of the first thread crest (Fig.1 or Fig.3) or on the face of the threaded diameter (Fig.2 or Fig.4). This specification is also necessary for the plugs with reference marks. By default we produce the plug according to Fig.1.

Availability

Lead-time is 3 to 4 weeks for manufacturing.

The reference standards

Unless otherwise specified, the tolerances of manufacture are in accordance with the specific standards relating to threads.

The tolerances for minimum or maximum lengths are according to customer specifications.

Example of order

Plug with flange for thread M8 x 1.25-6H – L=25 +/- 0.05 : GO threaded plug gauge for thread M8 x 1.25-6H with Flange for controlling a depth of 25 to accuracy +/-0,05.



Production of Custom Plug Gauges

With air escape or cleaning groove



Uses

These options are used for the checking of plain blind holes or on unclean threaded holes.

The reference standards

NF E 11.033 for plain plug gauges.

With small diameter lead in type

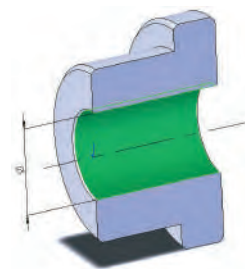


Uses

This option is used to offer a lead in on a plain plug gauge.

The reference standards

NF E 11.033



Pilot gauges



Uses

This option is used to offer a lead in on a plain plug gauge.

The reference standards

NF E 11.033

Routed and Flat gauges



Uses

This type of gauge is used in order to detect possible ovality or to check for conformity in several places on a part (useful if a parts fails a "NOGO" gauge).

Application

Unless otherwise specified, we supply a flat gauge for diameters up to 12 mm and a routed gauge for all larger diameters.

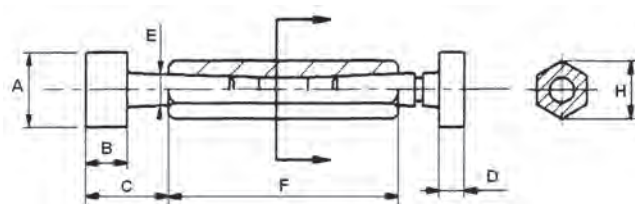
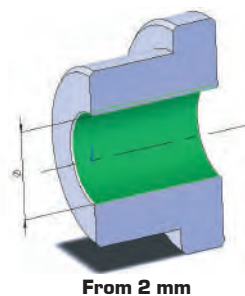
The reference standards

NF E 11.033





Polygonal and Torx Plain Plug Gauges



General dimensions

The dimensions B, C and D are identical to those given in tables on page 13 for the steel plain plug gauges.

Availability

Please contact us.

The reference standard

Unless otherwise specified, the tolerances of manufacture are in accordance with NF IN ISO 23429 (for six sides).

It is also possible to produce in accordance with NF E 02.202, if required.

Example of order

Double ended hexagonal plain plug gauge with “GO” and “NOGO” at 10 mm.

Torx gauges, Hexagonal plug gauges



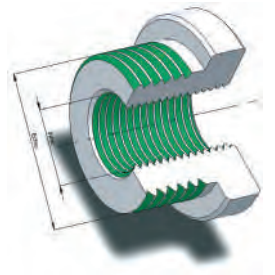
Master ring gauge for the control of Torx ® profile to customer specifications.



Plug gauge T25 to standard NF EN ISO 10664.



Special Gauges relating to Automated Checking



Applications

The automation of controlling is an ever increasing requirement in order to obtain the conformity of the products within strict limits on the time for control. In order to service this need we have developed and continue to supply more and more gauges with smooth or square sections, or hexagonal optimised for the verification of parts as they leave production vices, chucks, hexagonal chucks...

Some examples are shown in the photos above.

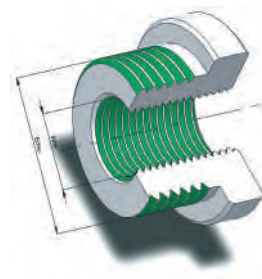
Availability

Please contact us for manufacturing lead-times.

The reference standards

This depends on the specifications of the parts to be checked.

For this type of gauge production, if you do not have your own specification, we can work with you to propose a solution to your gauging needs.



Applications

In order to increase the lifespan of your gauges, we can propose surface coatings to you that are identical to those used by ourselves . Typically we propose TiCn coatings that make it possible to reach a surface hardness of 3700 HV. We also offer other coatings to help improve the ease of entry... please contact us for more information. Some examples are proposed in the photos above.

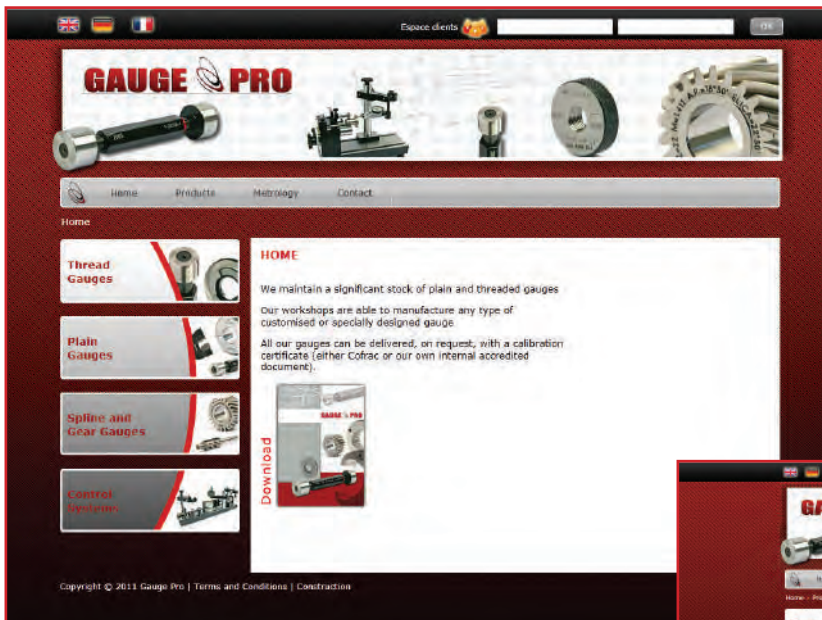
Availability

Please contact us for manufacturing lead-times.

The reference standards

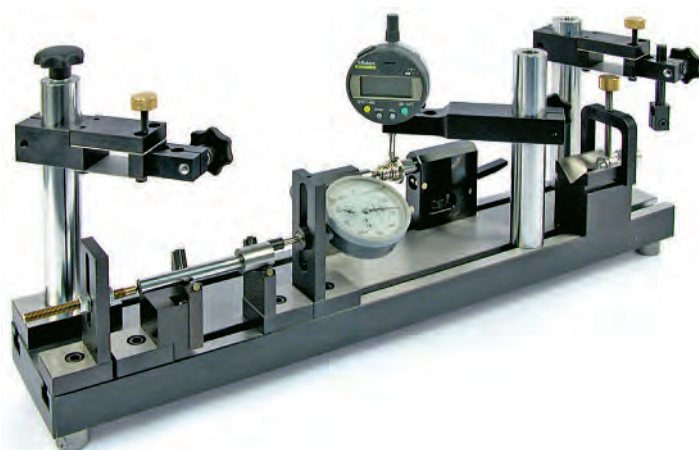
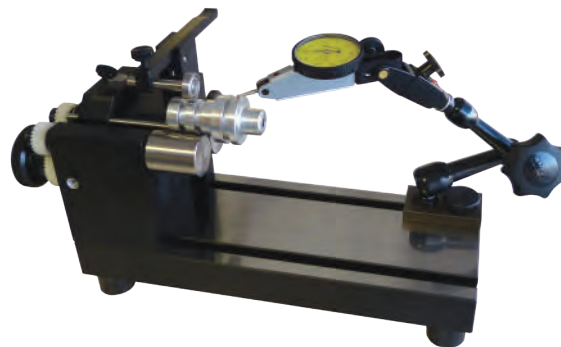
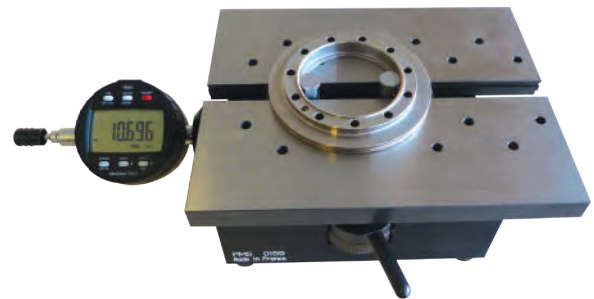
The precise nature of the coatings proposed make it possible, in all cases, to respect the specifications of the standards for plain gauges, threaded gauges, grooved gauges...

For further information, visit our website at
www.gauge-pro.com



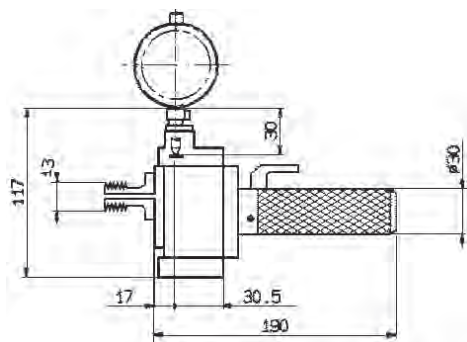
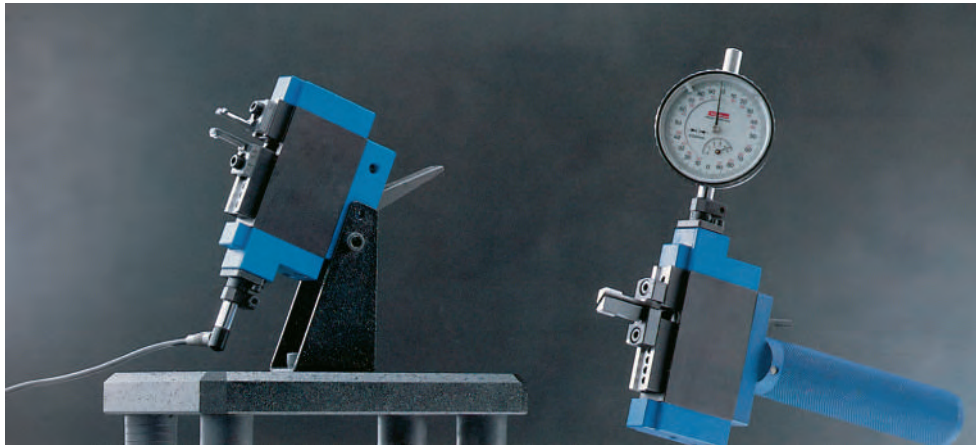
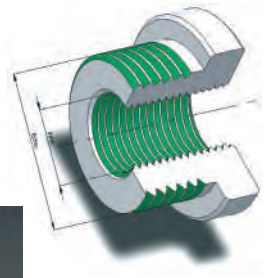
- Find all our items online
- Login in and request a quotation
- Contact us : sales@gauge-pro.com

SPECIAL EQUIPMENT AND SOLUTIONS FOR INSPECTION





Equipment for the Control of Threads «Easy»



EASY - IB : Version on base plate for internal controls
EASY - EB : Version on base plate for external controls

EASY - IP : Portable version for internal controls
EASY - EP : Portable version for external controls

Applications

The “Easy” equipment enables the control of the effective diameters on internal threads, external threads, splined profiles, special grooves and other profiles. The “Easy” equipment is assembled on a base plate (or equipped with a handle to make them portable).

Advantages

- Steel body.
- The moving jaw travels on a ball guide with no play.
- Adapted mechanical or digital dial indicators and inductive probes (Ø8 fixing).
- Interchangeable jaws are quickly changed.
- Total range of 6 mm.
- Standard measurement force of 5N (other values are possible).

Example of order

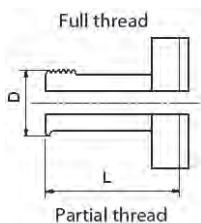
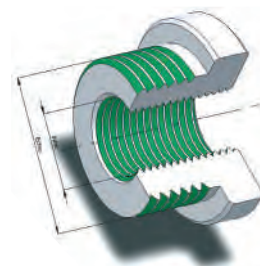
EASY - IB : “Easy” equipment assembled on a base plate for control of an internal screw thread for example.





Various Contact Points and Jaws for the “Easy” Equipment

JAWS FOR THE CONTROL OF INTERNAL THREADS

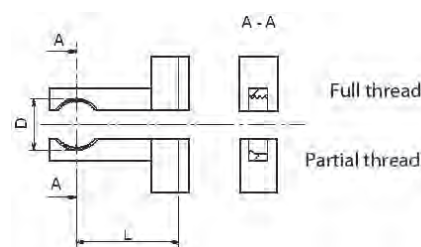


D	L
6 mm to 8 mm	17 mm
8 mm to 10 mm	19 mm
10 mm to 12 mm	22 mm
12 mm to 14 mm	24 mm

D	L
14 mm to 22 mm	26 mm
22 mm to 30 mm	31 mm
30 mm to 40 mm	36 mm
40 mm to 100 mm	40 mm

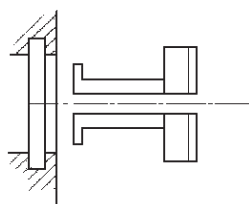
JAWS FOR THE CONTROL OF EXTERNAL THREADS

D	L
4 mm to 5 mm	10 mm
6 mm to 7 mm	11 mm
8 mm to 9 mm	14 mm
9 mm to 10 mm	16 mm

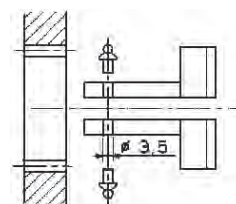


57

CONTACT POINTS FOR THE CONTROL OF UNDERCUTS



CONTACT POINTS FOR THE CONTROL OF INTERNAL SPLINES



Example of order

SET OF JAWS FOR “EASY” M10 X 1.00 – 6H : Jaws for “Easy” equipment with complete threads for checking an internal screw thread.

This type of equipment requires the use of a setting gauge, which we can supply. In this case a thread setting **ring gauge of M10 x1.00** with an effective diameter in the middle of tolerance, the product is engraved with the reference value.



Measurement Table

Application

To permit the inspection of holes, internal and external grooves/throats, cavities, diameters, lengths between grooves/throats, distances between centres, threads...

The measurement by comparison guarantees a high measuring accuracy.

Currently used in workshops, metrology laboratories...

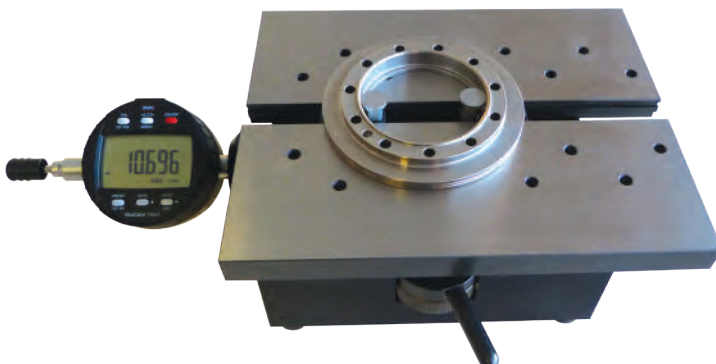
We regularly develop new or special versions to meet the demands of its customers.

Features

The direction of instant measurement is reversible via a knurled thumb wheel (internal/external measurement).

Clamping force of the roller is adjustable. Left/right movement stops are independently adjustable by 2 buttons.

All the precision parts are hardened and ground.



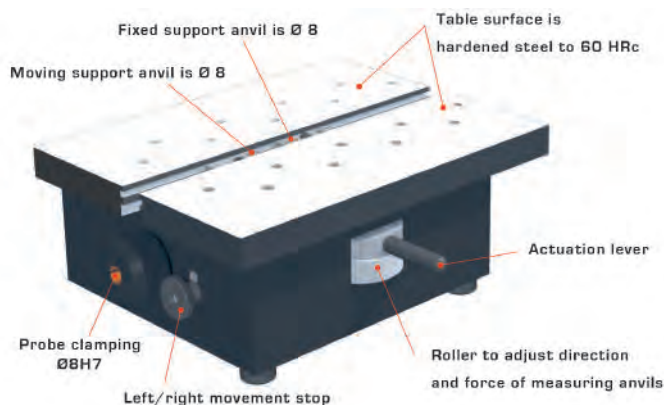
Measuring accuracy : < 0.001 mm

Reference	Range (according to the anvils used)		Nb. of measuring points	Adjustable height	Moving distance (mm)
	Exterior (mm)	Interior (mm)			
PMS6400	0 - 130	3.5 - 145	2 points	-	35 (linear guidance)
PMS6401	0 - 130	X - 145	3 points	-	35 (linear guidance)
PMS6402	0 - 100	3.5 - 125	2 points	V (35 mm)	35 (linear guidance)
PMS6410	0 - 180	3.5 - 195	2 points	-	35 (linear guidance)
PMS6420	0 - 130	3.5 - 145	2 points	-	± 2 (flexible)
PMS6421	0 - 130	X - 145	3 points	-	± 2 (flexible)

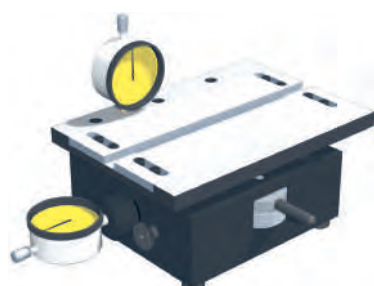
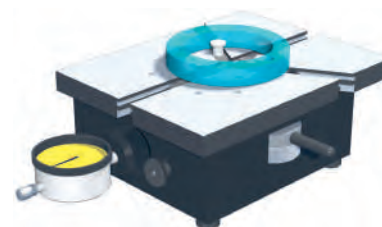
Standard table is delivered naked, without anvils, no means of display.

We also manufacture the setting gauges to help you set up the tables (rings, plate, gauge...), we can therefore specify the equipment to allow you to inspect the dimensions you require.

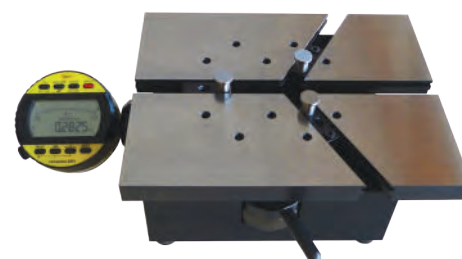
They can be delivered with a certificate of calibration.



Version with 3 contact points at 120°, this allows for the checking of triangulation
Ref. PMS6401



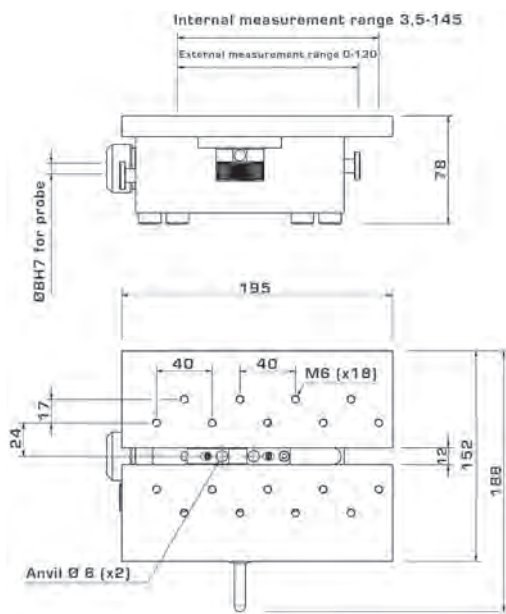
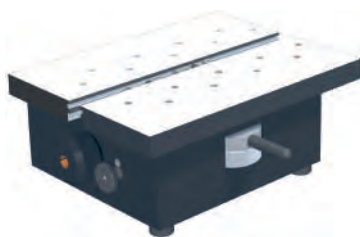
Version with table work surface and base, vertical movement 35 mm
Ref. PMS6402



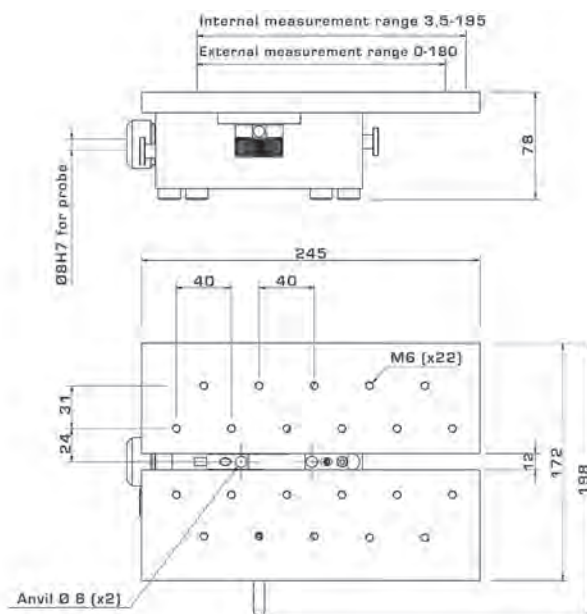
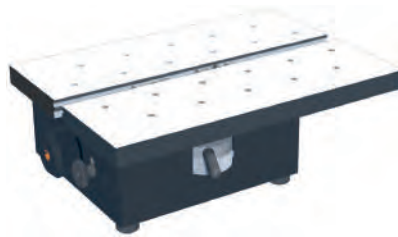


Measurement Table

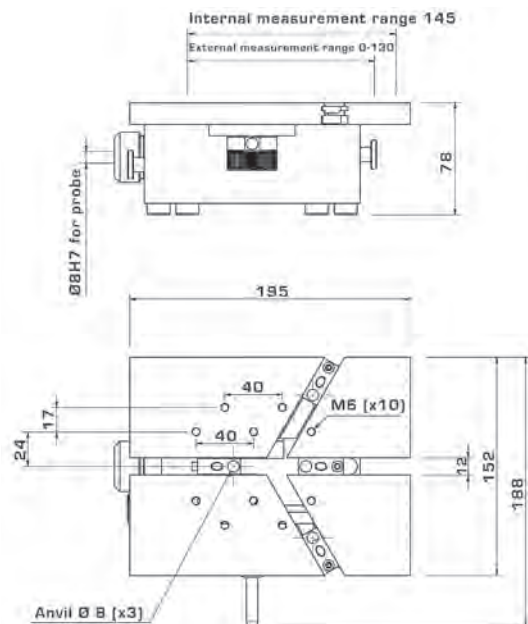
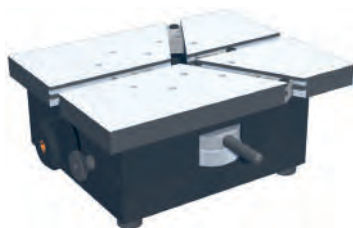
Standard model
Ref. PM56400



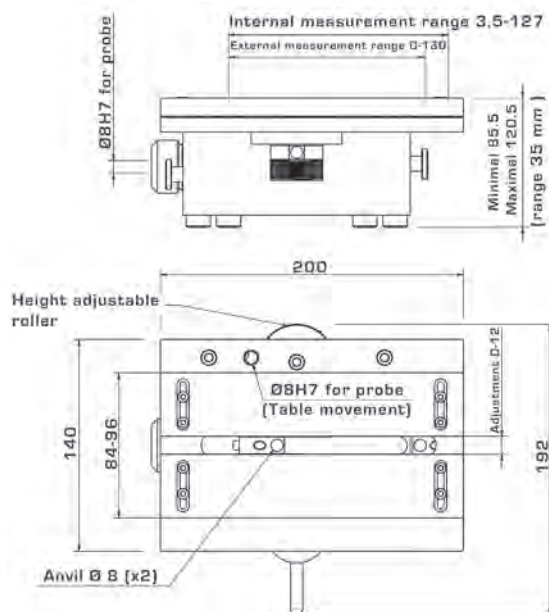
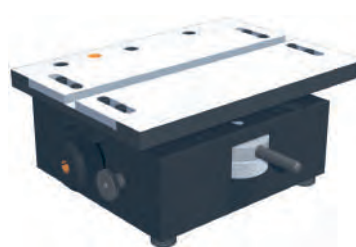
Large capacity model
Ref. PM56410



3 points positioning 120°
Ref. PM56401



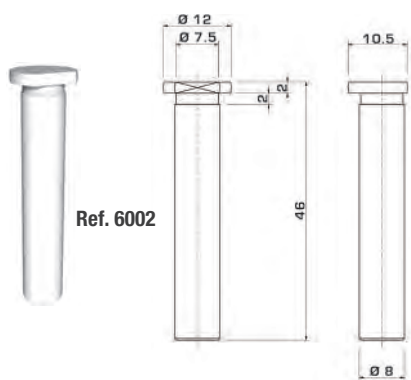
Model table work surface & base
Ref. PM56402



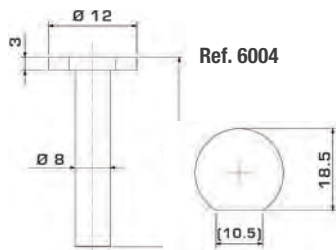


Measurement Table

Measurement Inserts



Ref. 6002

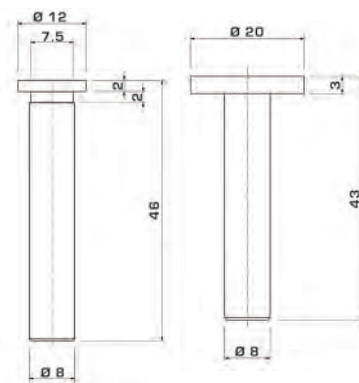


Ref. 6004

Please specify at the end of the part number:
-2: set of 2 inserts
-3: set of 3 inserts
Ex : PMS6003-2



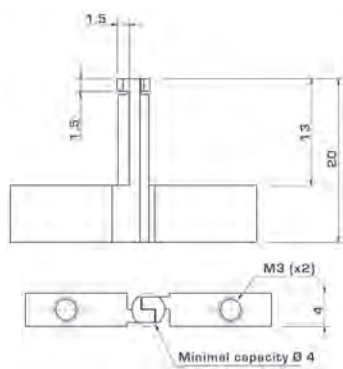
Ref. 6001



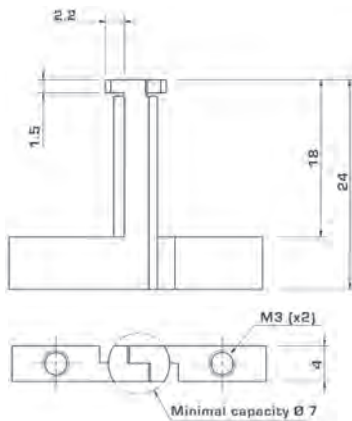
Ref. 6003

Reference	Type
PMS6002	Internal inserts Ø 24 minimum + exterior
PMS6004	Internal inserts Ø 37 minimum + exterior

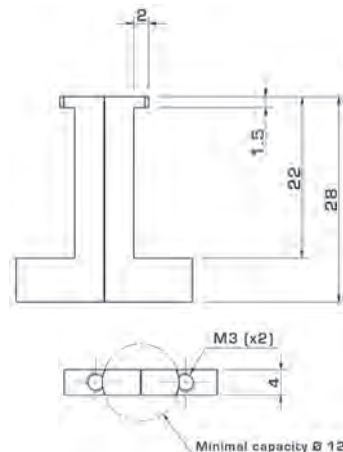
Reference	Type
PMS6001	Internal insert Ø 24 minimum
PMS6003	Internal insert Ø 40 minimum



Ref. 6012 (use with Ref. 6010)



Ref. 6013 (use with Ref. 6010)



Ref. 6014 (use with Ref. 6010)

Reference	Type
PMS6012	Internal "crossing" inserts Ø 4 minimum
PMS6013	Internal "crossing" inserts Ø 7 minimum
PMS6014	Internal inserts Ø 12 minimum
PMS6016	Inserts with machined slots
PMS6010	Support for internal inserts
PMS6020	Radial and axial anvil support M2.5



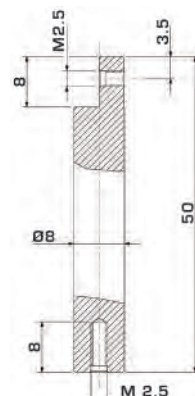
Set of inserts to hold parts between undercuts
Ref. 6016 + 6010



Ref. 6010



Support unit
+ "crossing" inserts
Ref. 6010 + 6013



Ref. 6020

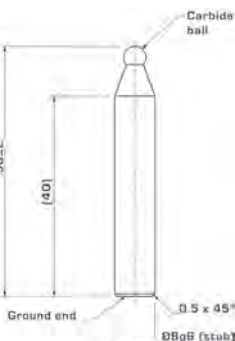


Measurement heads,
see on pages 102 to 106

Example of special inserts/anvils

We manufacture all types of inserts to customers requests according to the drawings, function, constraints....

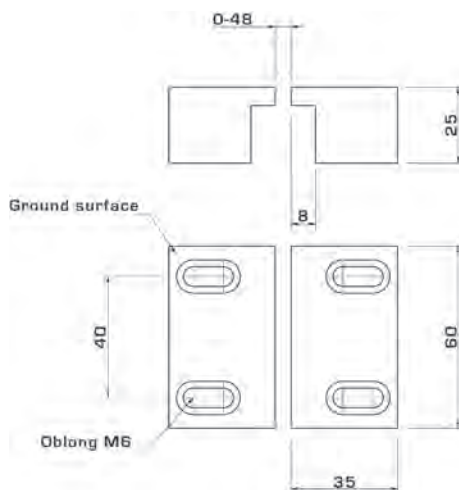
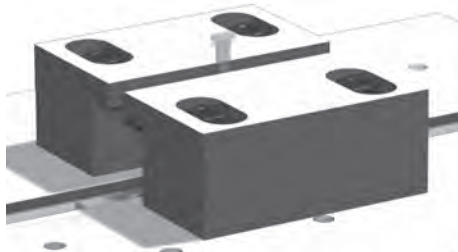
Many items are held in stock: for larger Ø's, there may be a short lead-time...



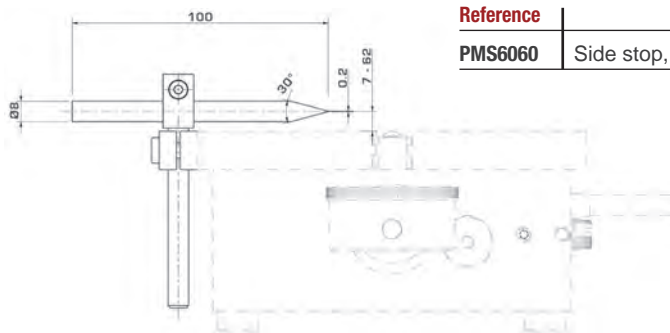
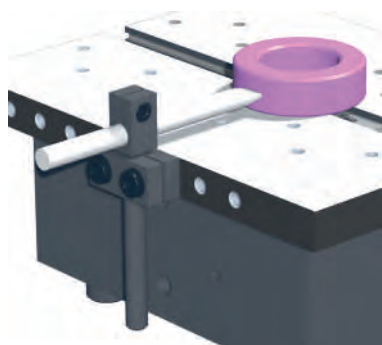


Measurement Table

Accessories

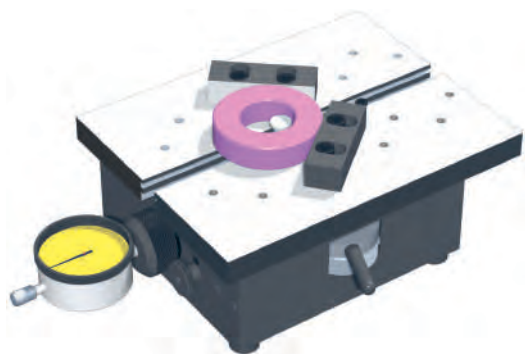
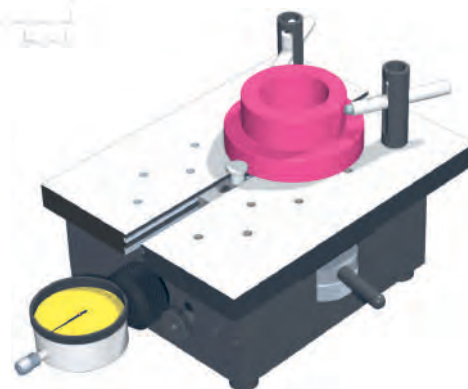


Reference	Type
PMS6050	Set of adjustable supports (for use with anvils PMS6012 to 6016)



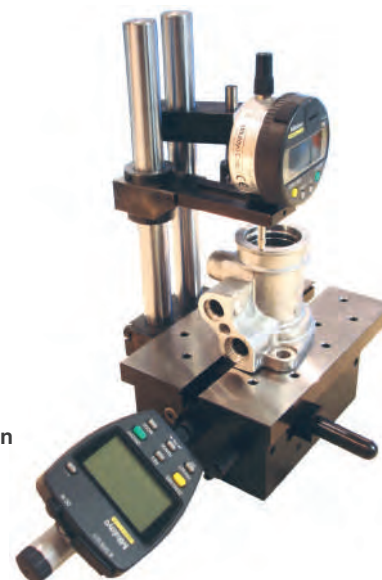
Reference	Type
PMS6060	Side stop, adjustable for direction and distance

Reference	Type
PMS6065	Horizontal anvil support Ø8



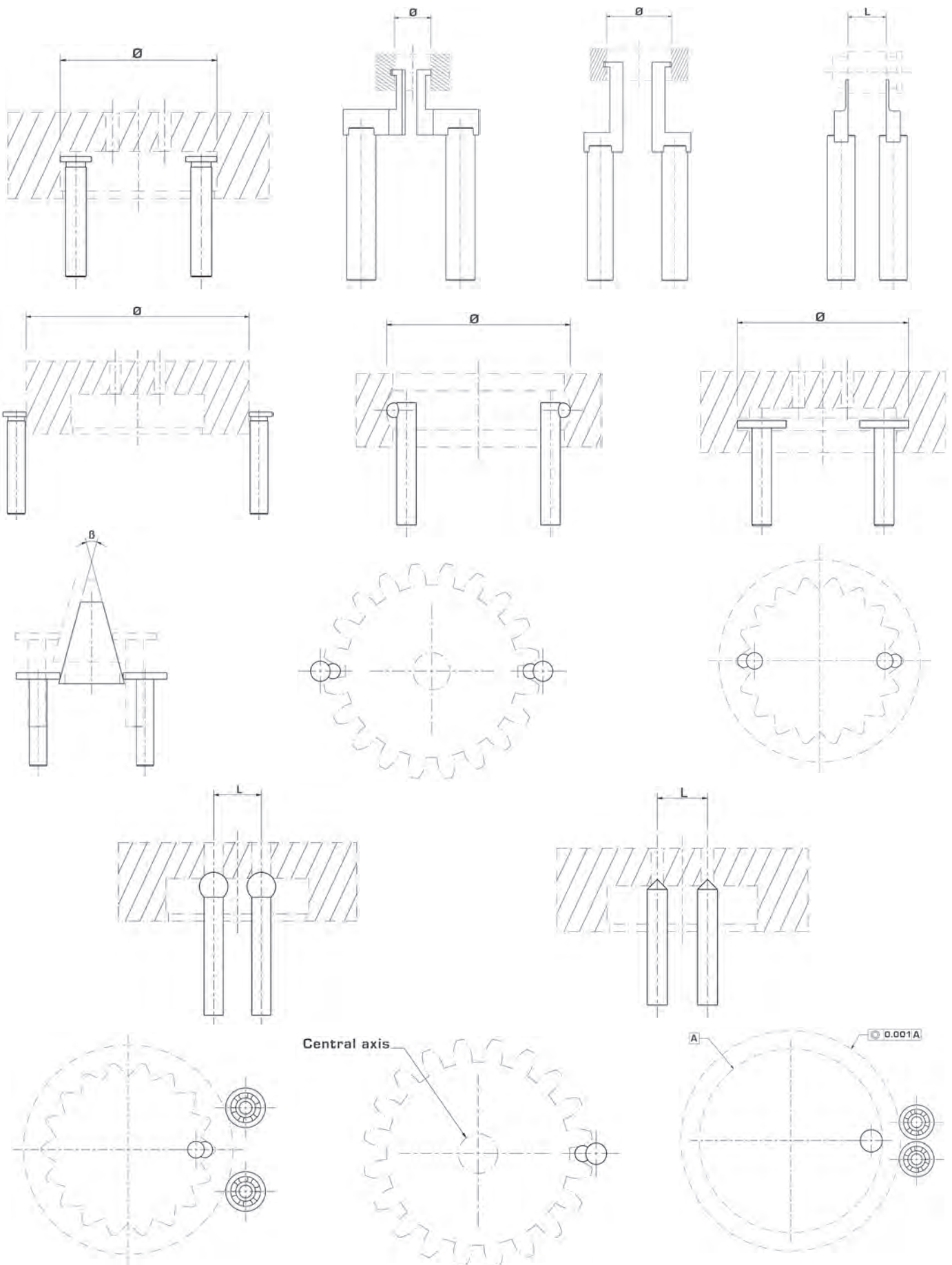
Reference	Type
PMS6061	External stop (at 120)

Example of a special application
Combined measurement





Examples of different applications





Measurement Table PMS4-56

Application

An inspection device for the measurement of internal diameters and grooves.

Range is from 4 mm to 56 mm, achievable by using different anvils.

The device is calibrated by setting rings, a micrometer or slips/block gauges...

A measuring instrument (comparator, sensor...) can be fixed in a Ø8 mm port.

The measurement by comparison guarantees a high level of measuring accuracy.

A very useful piece of equipment in a workshop, metrology laboratory, etc...

Features

Self-returning lever (either left or right handed).

The measurement force can be adjusted by changing the spring on the device.

The moving anvil runs on bearings for a smooth action.

The table is made from hardened steel and ground, the size is 115 X 70 mm.

All the precision parts are hardened and ground.

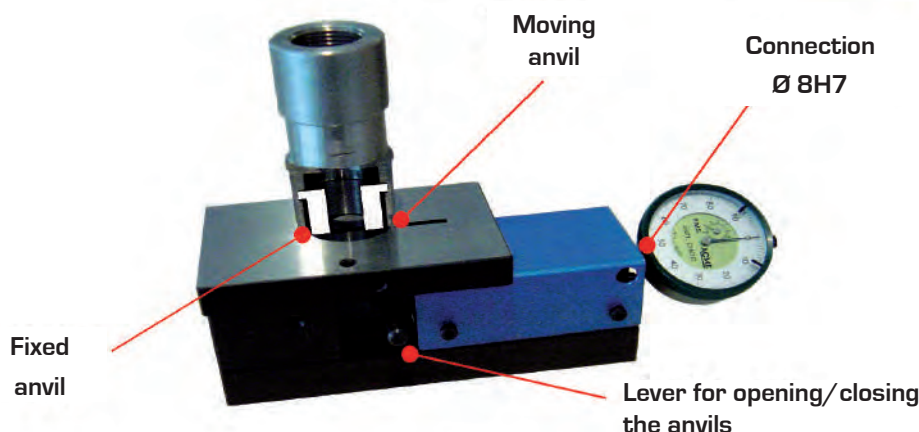
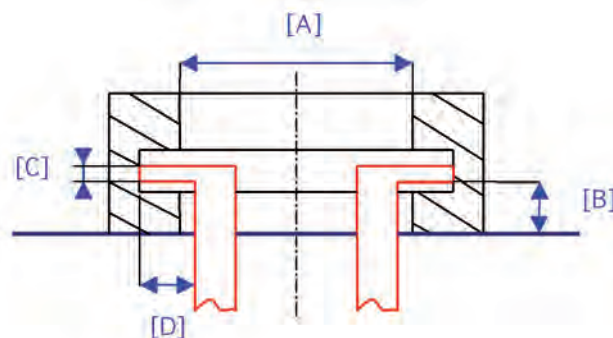
Measuring accuracy : < 0.005 mm

Reference	Range [A] mm	Maximum height [B] mm	Thickness [C] mm	Release [D] mm
PMS456	The basic table is naked with a range of 4 to 56mm			
Anvil n°1	4 to 7	11	1,65	1,5
Anvil n°2	7 to 12	14	1,65	2
Anvil n°3	12 to 24	20	1,65	2
Anvil n°4	25 to 56	30	1,65	3

The standard, naked device is delivered without anvils or any means of supporting work pieces.

We manufacture setting gauges to calibrate the table (rings, plates, gauges...), we can therefore specify the accessories to allow you to inspect the dimensions you require.

They can be supplied with a certificate of calibration.





The Measuring «C»

Application

The measuring "C" is a solution we adapted to achieve a fast and precise quality control of the external dimensions of cylindrical parts. It is ideal for grinding and turning machine operators.

This equipment is widely used on machines, in workshops, for sorting actions, in metrology laboratories...

We are the original manufacturer of the Measurement "C" and continues to provide customers with an unbeaten level of production quality since 1992.

Features

Adjustable threaded stop.

Ambidextrous lever/trigger, can be used from left or right.

Interchangeable supports.

All the precision parts are hardened and ground, the anvil ends are made in carbide (or other materials or coatings, for example : diamond or TiCN coating...).

The base structure is made from special stabilized steel.



Measuring accuracy : < 0.001 mm as standard

Reference	Range mm	Ø Anvils mm	Carbide measuring anvils		Release anvil (moving) mm
			Flatness (µm)	// (µm)	
PMS5300	0 - 40	1 to 8	< 0,1	< 1	12
PMS5500	0 - 90	1 to 9	< 0,2	< 1	12
PMS5560	35 - 90	1 to 9	< 0,2	< 1	12
PMS5700	75 - 150	1 to 11	< 0,3	< 2	5
PMS5710	75 - 150	1 to 11	< 0,3	< 2	12
	... - 500	1 to 12			

Please specify the Ø of the anvils you require after the reference (example : PMS5300-8)

There are also interchangeable anvils: Just add - TI (example: PMS5300-TI), see table

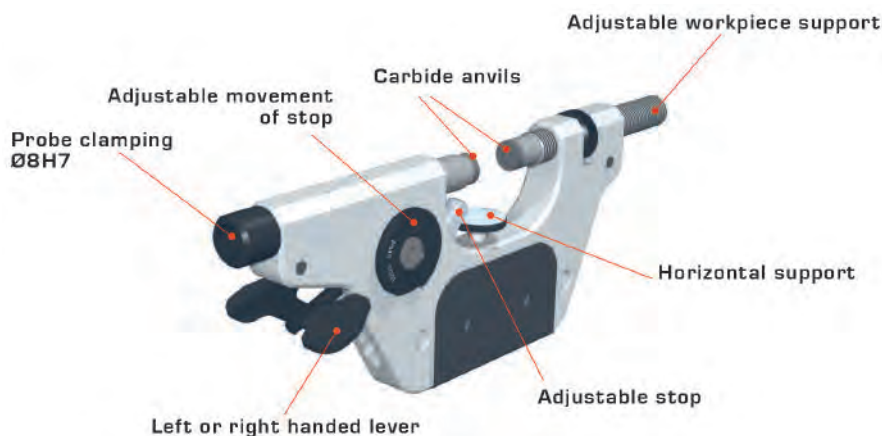
PMS5001	PMS5001 Support for Measurement "C" 40 and 90 mm
---------	--

We manufacture the setting gauges to calibrate the Measuring "C" (master pins/rods, blocks, gauges...), just let us know the dimension to be controlled. They can be supplied with a certificate of calibration.

Models with interchangeable anvils

Reference	Model
PMS5300-TI	"C" 0-30 mm naked
PMS5500-TI	"C" 0-80 mm naked
PMS5560-TI	"C" 35-80 mm naked
Interchangeable anvil type	
PMS5310-1	Anvils Ø 2 W
PMS5310-2	Anvils Ø 5 W
PMS5310-3	Anvils Ø 2 W Knife type
PMS5310-4	Anvils Ø 2 W 1/2 Knife type
PMS5310-5	Anvils Ø 2 W Pointed type

Other forms available on request



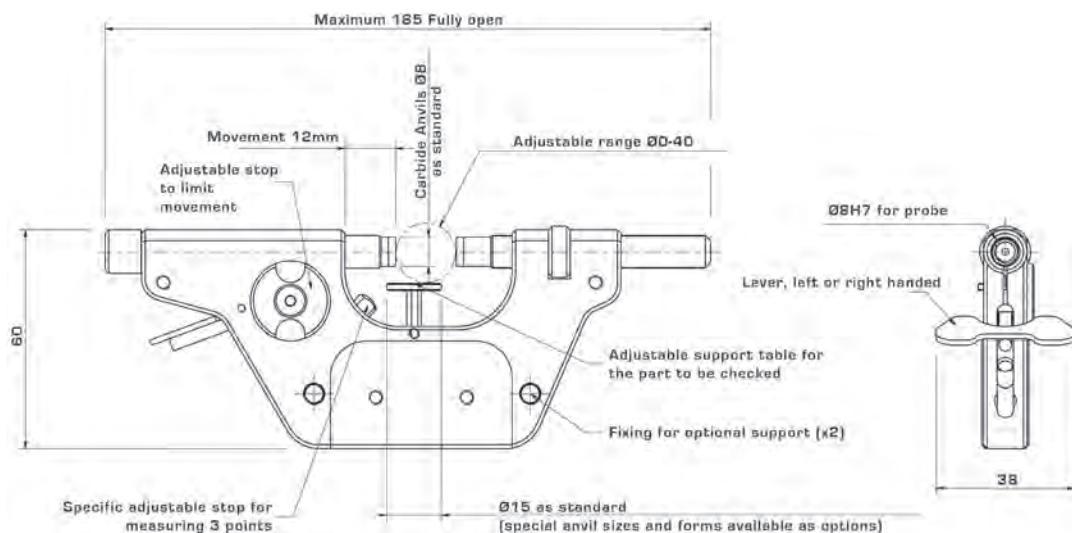
We manufacture our products for a precise measurement, if however you need a very high precision, please let us know and we can work with you on your requirements.



The Measuring «C»

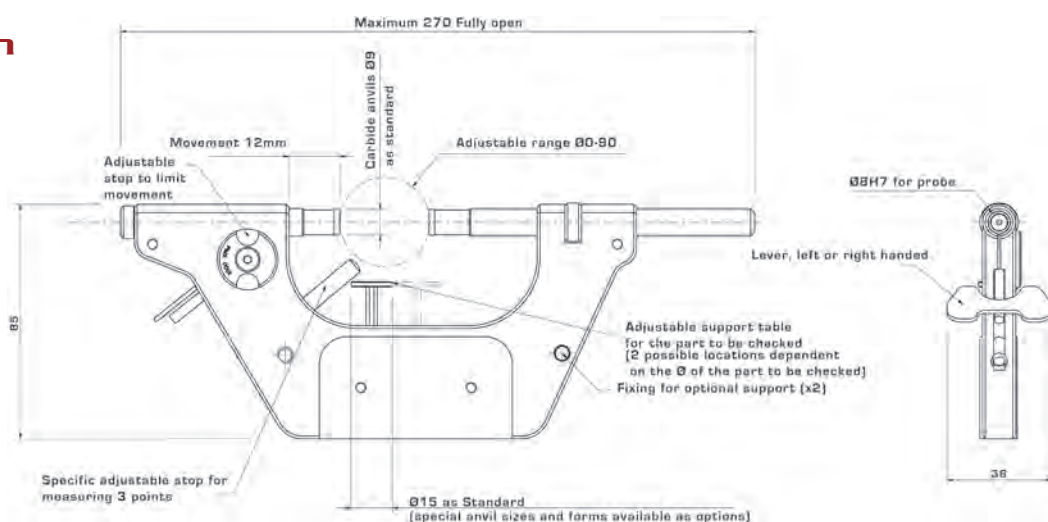
Range 0-40 mm

Ref. PM55300

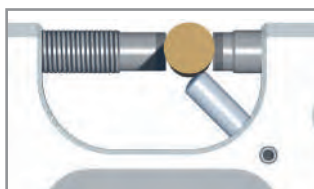


Range 0-90 mm

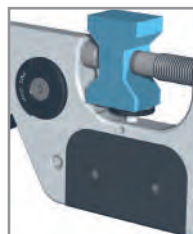
Ref. PM555XX



65



Example of 3 point stop in use



Example of part support table in use



Model with knife anvils

all forms are possible, following your requirement

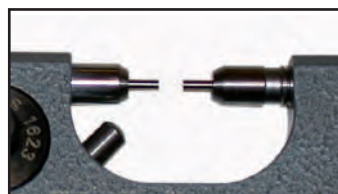


Model with cylindrical anvils



Model with ball anvils

For measuring splines



Chamfer Measurement

Application

To enable the direct measurement of height of internal and external chamfers, for all angles.

Currently used in workshops, with quality sorting actions, metrology laboratories...

Features

For the direct measurement of the height of chamfers.

A knurled roller selects the angle, with locking feature for safety in operation (PMS910X).

We can manufacture special measuring pins according to your application.

The measuring pin that contacts the work piece is made out of carbide.

All the precision parts are hardened and ground.

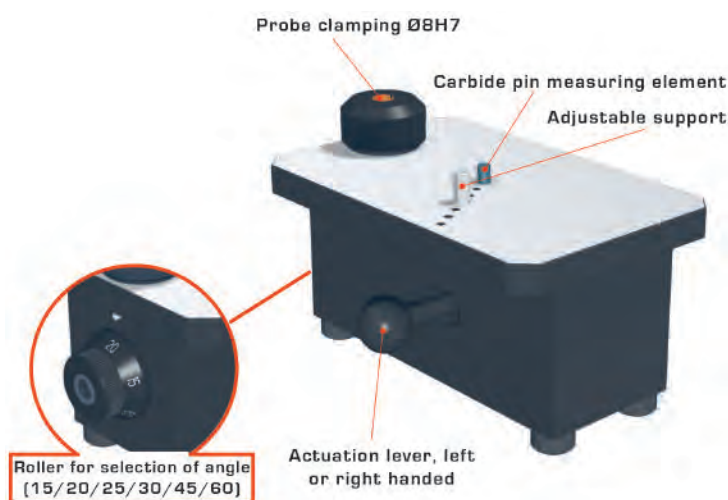


Measurement precision : < 0.01 mm

Reference	Height of chamfer (mm)	Range		Read-out	Reading (mm)	Angle (°)
		Internal \varnothing (mm)	External \varnothing (mm)			
PMS9100	0.05 - 5.50	5 - 95	4 - 120	Digital with Preset	0.01	15 - 20 - 25 30 - 45 - 60 Other angles upon request
PMS9101		5 - 95	4 - 120	Needle	0.01	
PMS9102		5 - 95	4 - 120	Needle	0.005	
PMS9120	0.05 - 15	-	5 - 50	Digital with Preset	0.01	45 Other angles upon request
PMS9121		-	5 - 50	Needle	0.01	

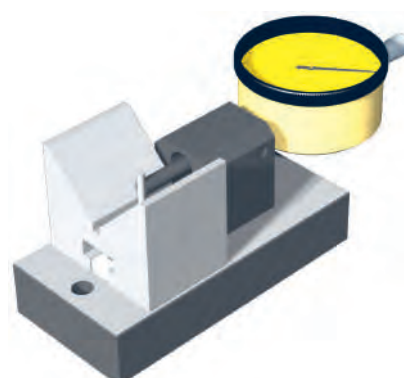
The equipment is delivered ready to use, with setting gauge for adjustment and read-out.

For other angles or bigger diameters, please contact us.

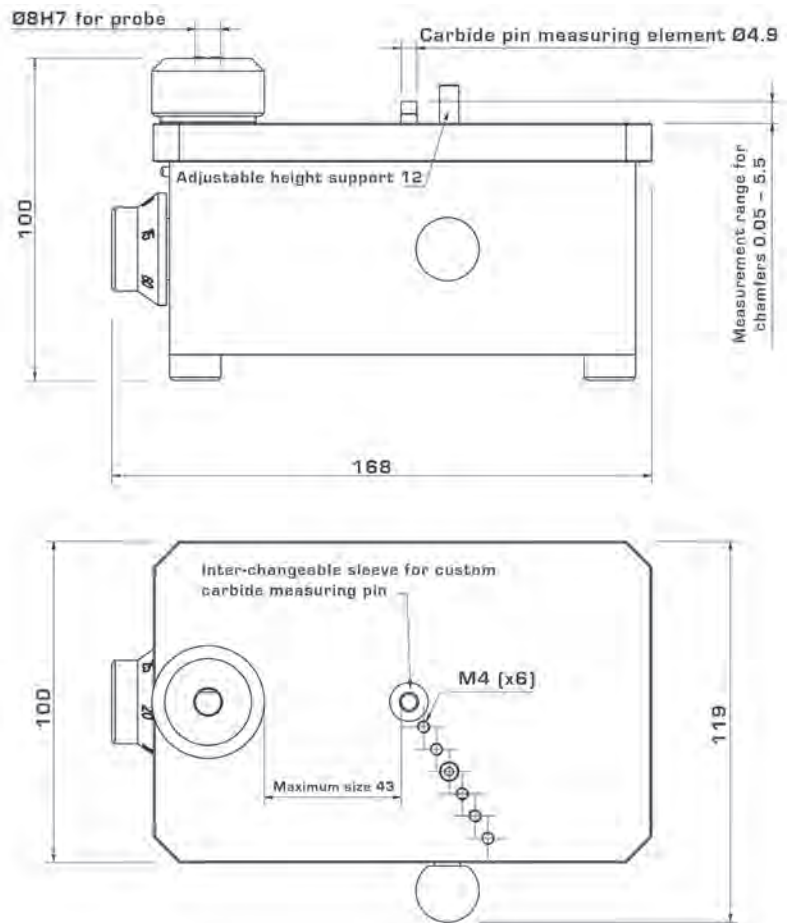
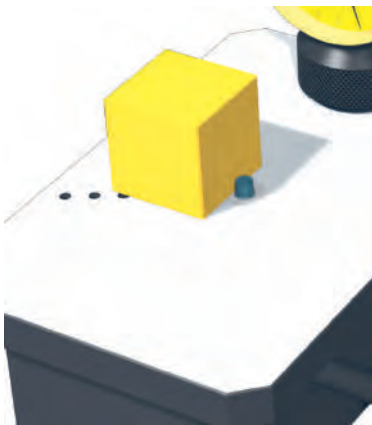
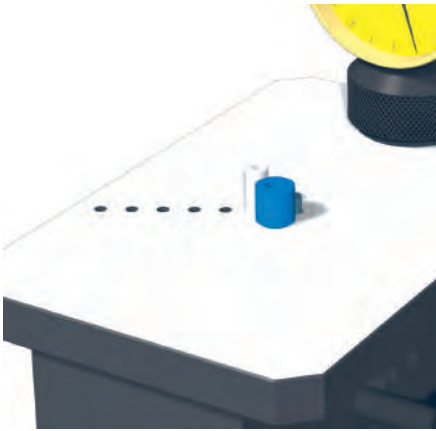


Internal / External table
with adjustable angle
Ref. PMS9100-9102

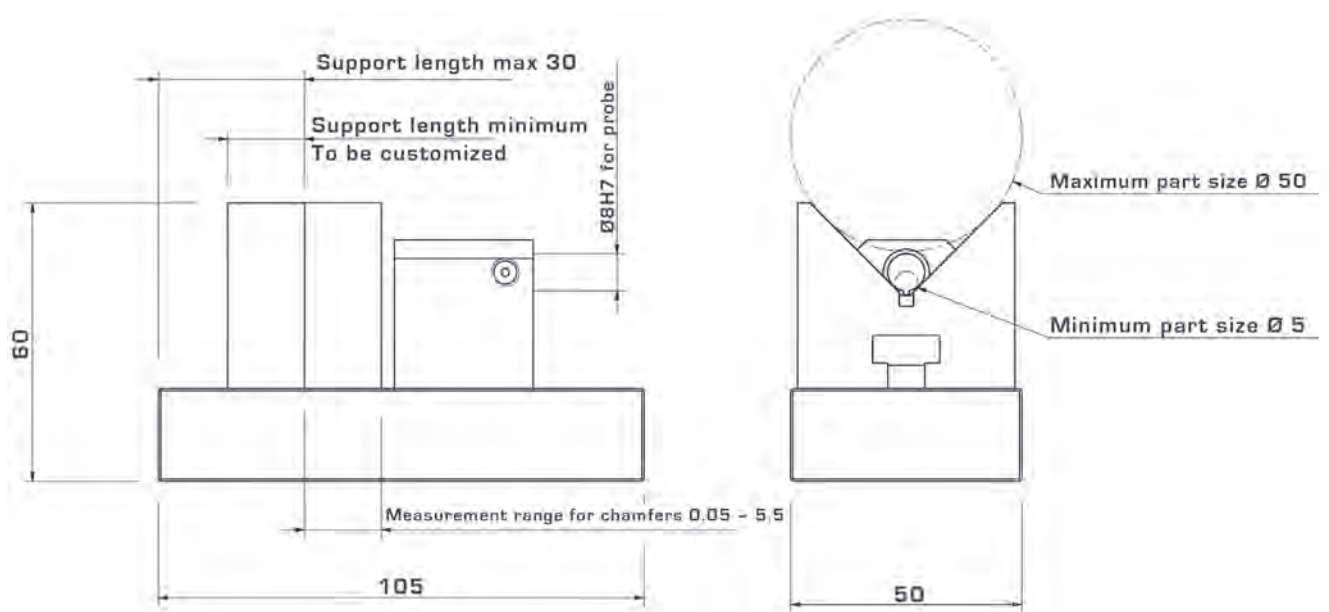
External only table with
fixed angle
Ref. PMS9120-9121



Model for internal and external measurement, Ref. PM59100 - 9102



Model for external measurement, Ref. PM59120 - 9121





Measurement of the Symmetry of Grooves or Keyways

Application

Allows the inspection of the centring of a groove or keyway.

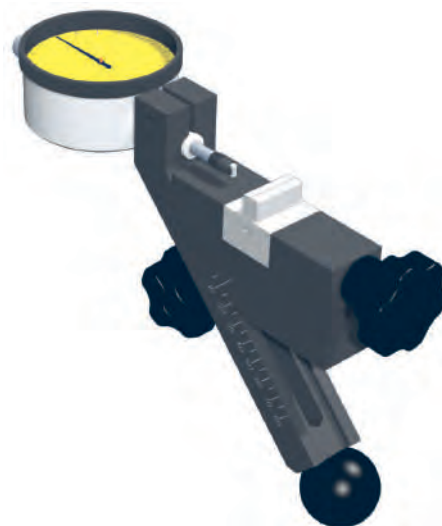
Currently used on machines, in workshops...

Features

Quick adjustment for the \varnothing of the measuring anvils.

All the precision parts are hardened and ground.

The body is anodized aluminium.



Measuring accuracy : < 0.01 mm

Reference	\varnothing Work Piece (mm)	Groove Width (mm)	Read-out	Reading (mm)
PMS9200	8 - 80	3 to 20	Digital with Preset	0.01
PMS9201			Needle \varnothing 40	
PMS9202			Needle \varnothing 58	

The equipment is delivered ready to use, with display fixings.

The anvils should be ordered separately according to the width dimension of the groove (please specify the tolerance).

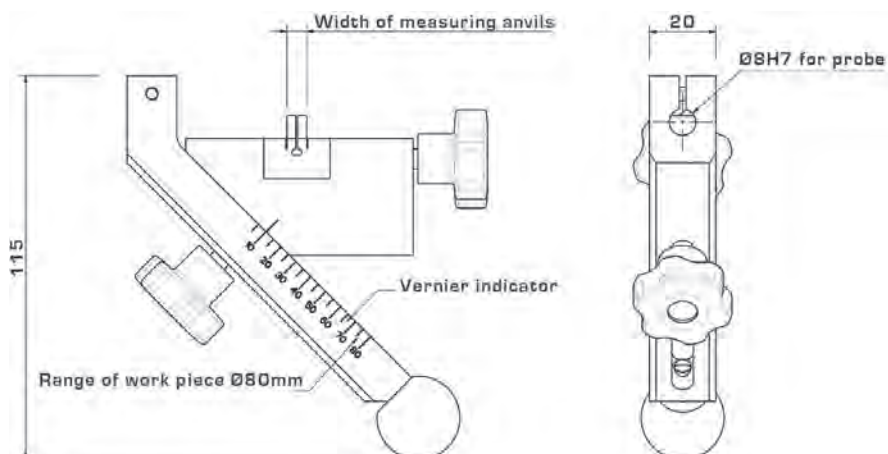
68



Measurement Principle:

- To centre the part on it's groove or keyway and to take a reference,
- To then use the equipment to take a measurement, after reversing the part, in order to obtain the defect of symmetry.

The value obtained is double that of the actual value of the defect of symmetry.



Application

Enables the measurement of \varnothing on the thread faces.

A set of knurled rollers makes it possible to control all the diameters in one step.

Currently used in workshops, metrology laboratories...

Features

Measures \varnothing on faces in 2 points, with supporting stop.

All the precision parts are hardened and ground.

Measuring accuracy : < 0.004 mm

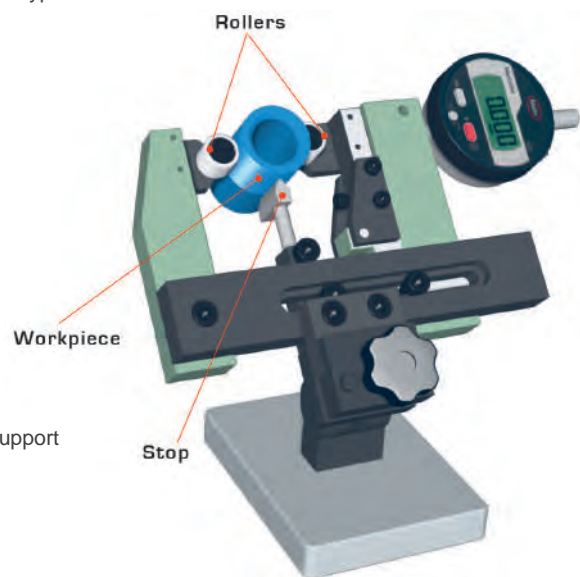
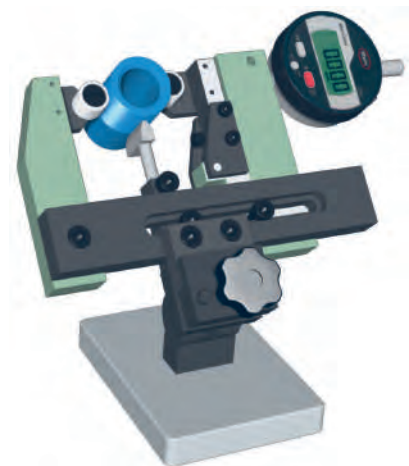
Reference	Range
	\varnothing (mm)
PMS9600	3 - 70

The device is delivered without display, or setting plug gauge.

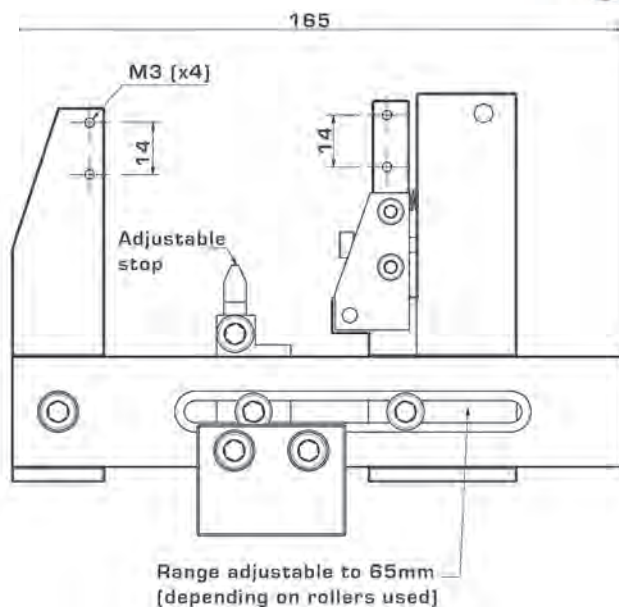
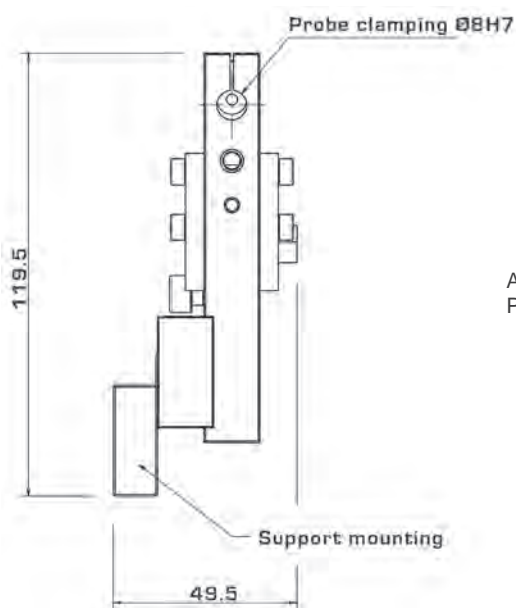
The clamping rollers are ordered according to the pitch and profile (55/60°...) that has to be inspected.

We manufacture the gauges to set-up the apparatus (setting gauges), let us know the type of thread.

It can be delivered with a certificate of calibration.



Assembled to the micrometer support PMS4201 or can be hand held.





Slotted Measuring Bench for Concentricity and Perpendicularity

Application

Allows the control of concentricity of a part and compares it to another reference therefore giving you the squareness of a face, works for both internal and external diameters.

Currently used in workshops, metrology laboratories...

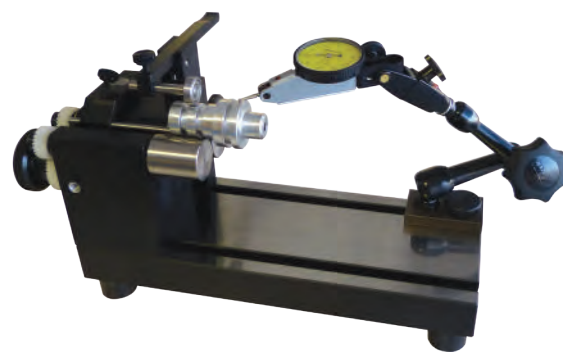
Features

The system has interchangeable rollers with ball bearing for the highest precision.

Helical gears are used for a permanently engaged action without play.

The force applied to the work piece is adjustable.

All the precision parts are hardened and ground.



Measuring accuracy : < 0.002 mm as standard

Reference	Range		Number of rotational speeds	Changeable rollers
	Ø mini (mm)	Ø maximum (mm)		
PMS7200	0.20	15	3	Yes
PMS7500	3.80	60	1	Yes
PMS7600	3.80	120	1	Yes
PMS7501	2.00	-	Optional Ø 2 mm for PMS7500 and PMS7600	

The references above comprise of only the system with rollers, the accessories (tables, columns, arm...) are to be ordered separately, please see page 76 to 79 (examples below).

Options :

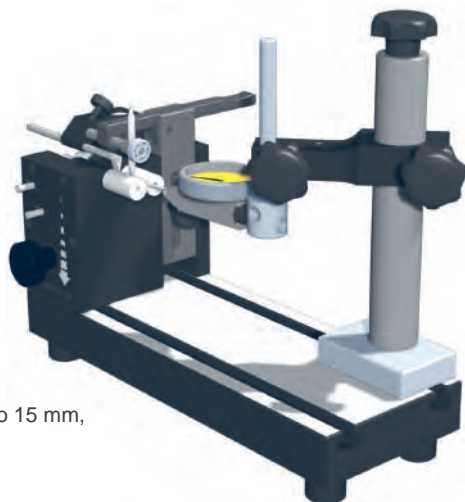
Special rollers to replace standard rollers.

Work piece support with miniature bearing.

Stop can be made to a special form.

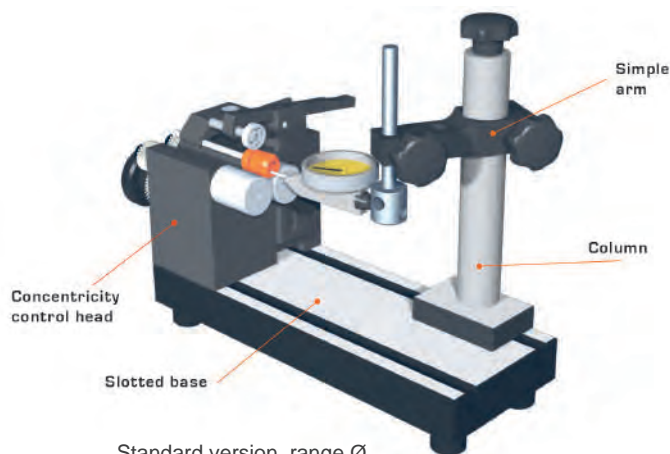
Different rotational speeds or special requirements.

Higher precision.



Mini version, Ø 0.2 to 15 mm,
with 3 speeds

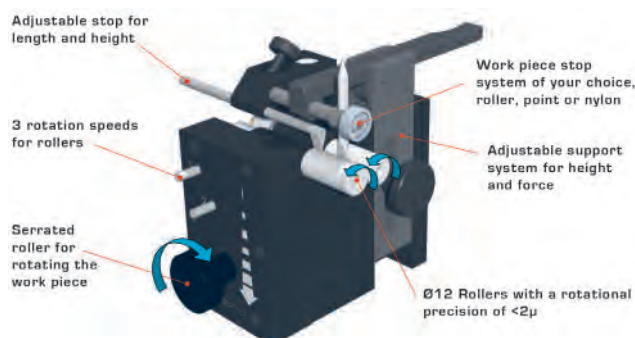
Ref. PMS7200



Standard version, range Ø
3.8 to 60 mm

(Optional Ø2 Mini)

Ref. PMS7500



Adjustable stop for
length and height

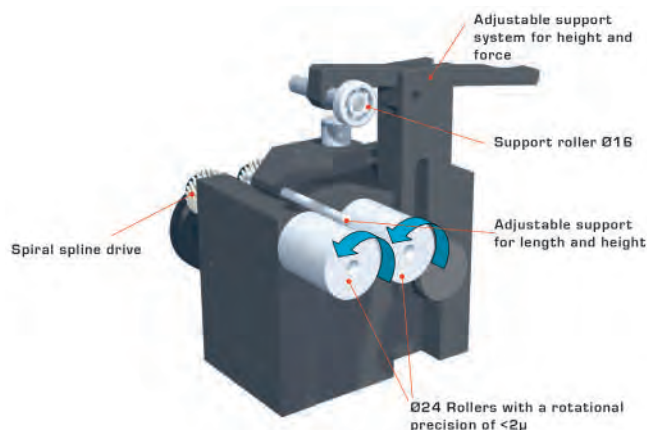
3 rotation speeds
for rollers

Serrated
roller for
rotating the
work piece

Work piece stop
system of your choice,
roller, point or nylon

Adjustable support
system for height
and force

Ø12 Rollers with a rotational
precision of <2µ



Adjustable support
system for height and
force

Support roller Ø16

Spiral spline drive

Adjustable support
for length and height

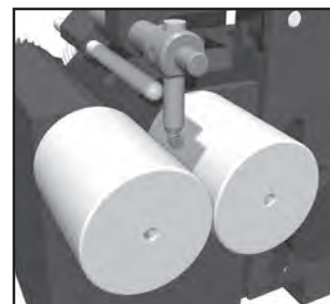
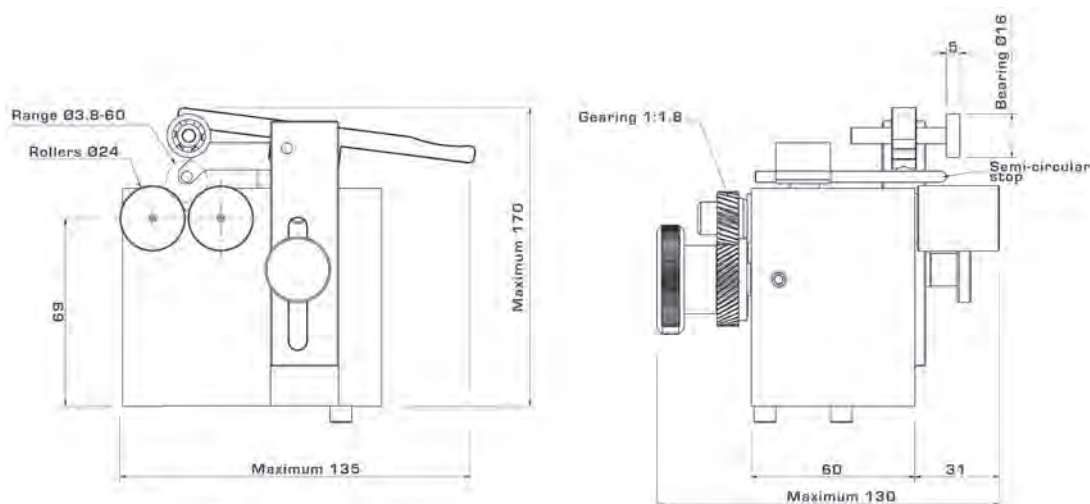
Ø24 Rollers with a rotational
precision of <2µ





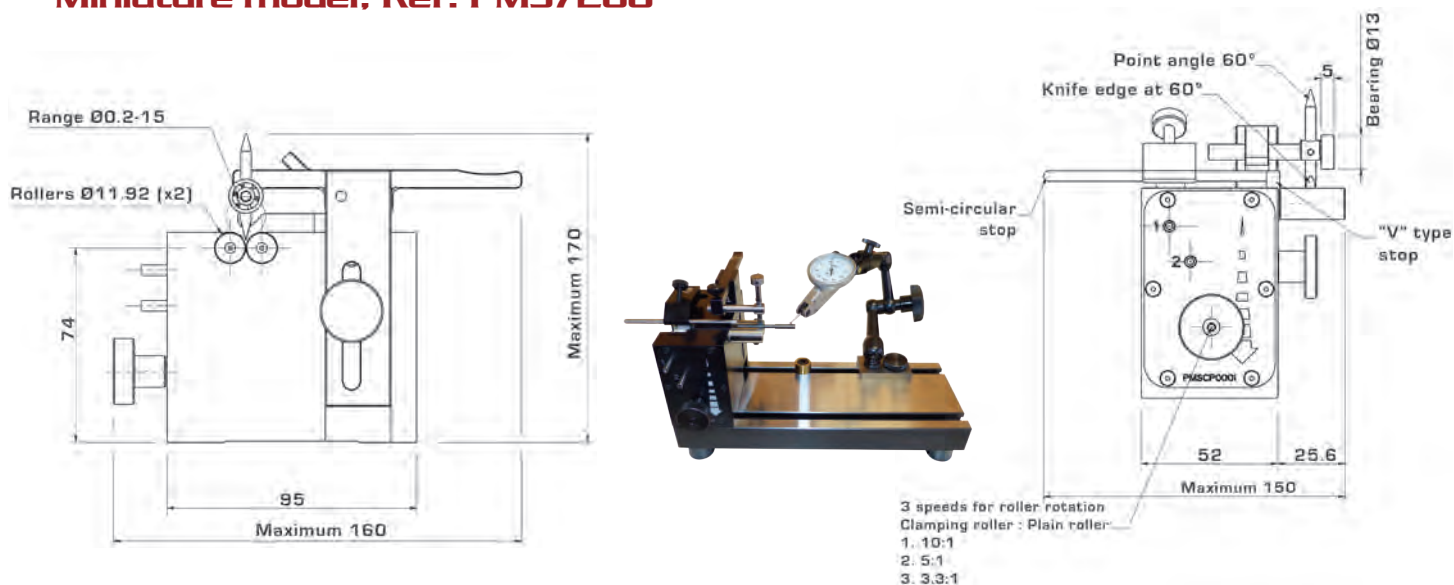
Slotted Measuring Bench for Concentricity and Perpendicularity

Standard model, Ref. PMS7500



Option Ø 2 mini
Ref. PMS7501

Miniature model, Ref. PMS7200



71

Examples of applications :



We offer special rollers, directly interchangeable with the standard rollers on your bench





Revolving Headstock for Clamping Collet W20

Application

It enables the inspection of concentricity, to check a face of a part compared to another reference and for interior to exterior comparisons.

Currently used in workshops, metrology laboratories...

Many adaptations are possible: motorization, test mandrel with a specific bit...

Usable on our range of keyway tables, profile projectors or your own application...

Features

The part is held in the W20 clamping collet or precision chuck with standard tail W20.

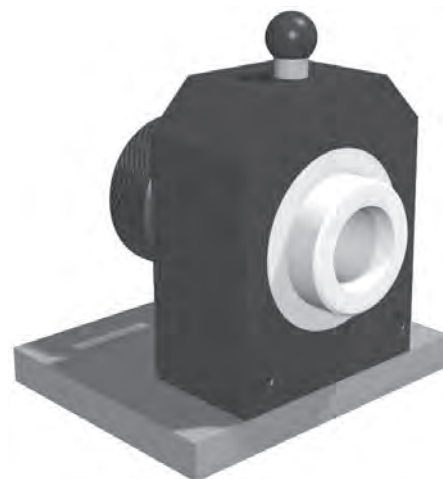
The rotation can be locked using a pin to allow opening of the chuck.

The spindle is mounted on precision bearings.

Fixing on our keyway table or base plate.

Modular accessories are usable with this application.

All the precision parts are hardened and ground.

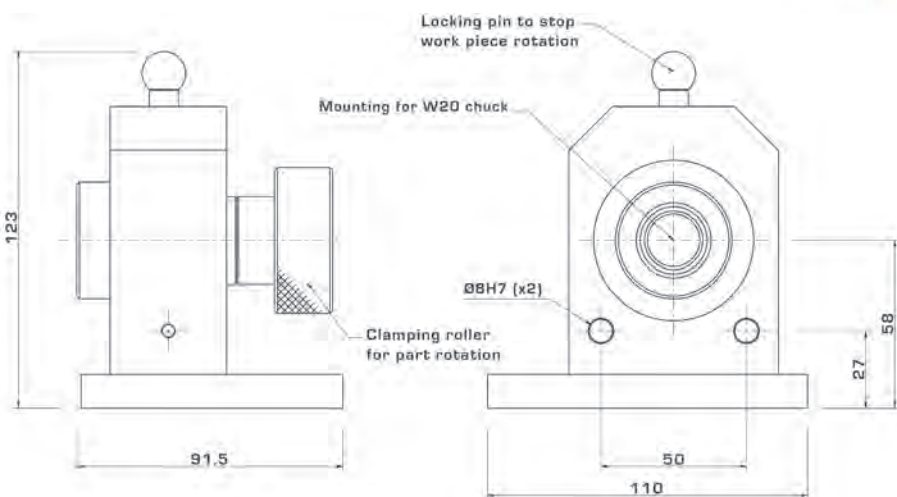
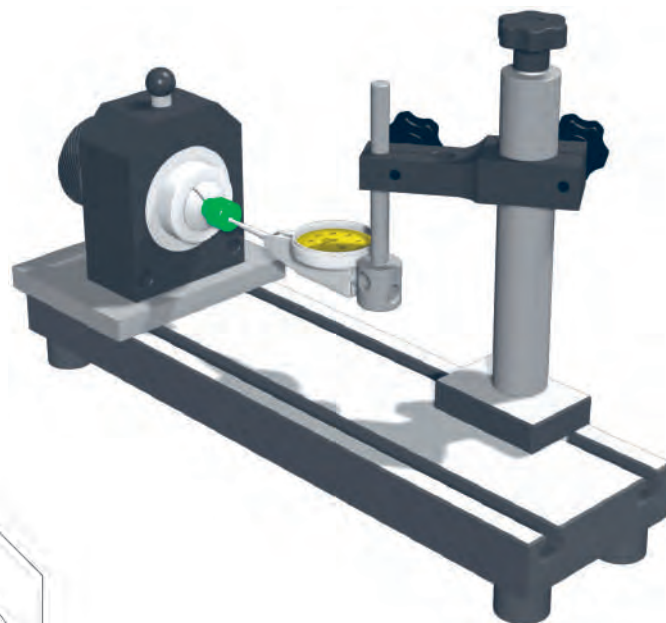


Precision of the mounting : < 0.004 mm as standard

Reference	Chuck	Clamping mounting
PMS7900	W20	YES

The headstock is delivered as base unit without chuck (either as standard precision or ultra high precision).

Accessories (table, columns, arm...) are ordered separately, see pages 76 to 79.



Options :

Higher precision.

Stop.





Adjustable Bench for «MAPAL» Reamers

Application

Allows the setting of external and internal reamer inserts «MAPAL» type.

Currently used in workshops...

Features

Due to the two points of measurement (internal reamer), the angle of the insert can be set accurately. This makes it possible to align the edge of the tool compared to its axis of rotation and to guarantee the bore quality.

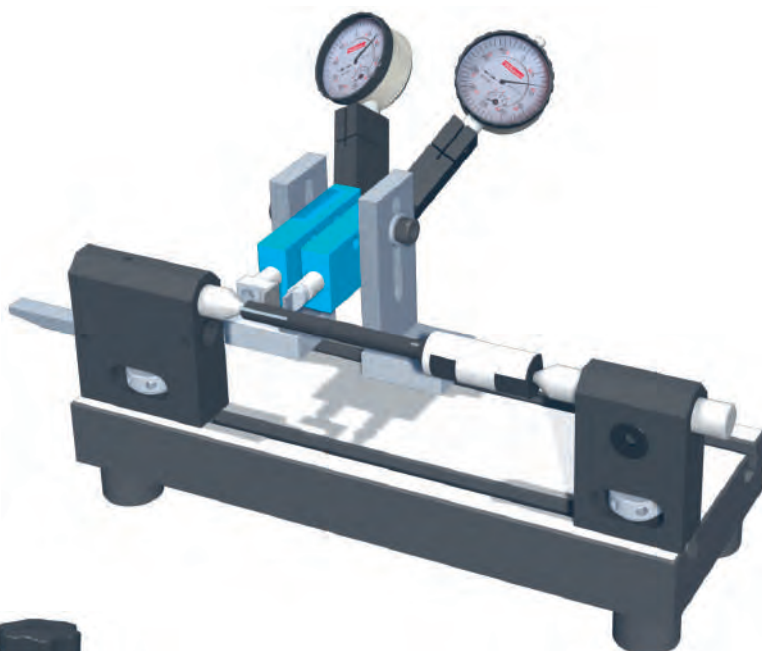
All the precision parts are hardened and ground.

Measuring accuracy : 0.002 mm

Reference	Type
PMS8100	Internal reamer
PMS8110	External reamer

Version for internal reamers, located in 2 points. Location of the work piece between points where one is fixed and the other adjustable

Ref. PMS8100

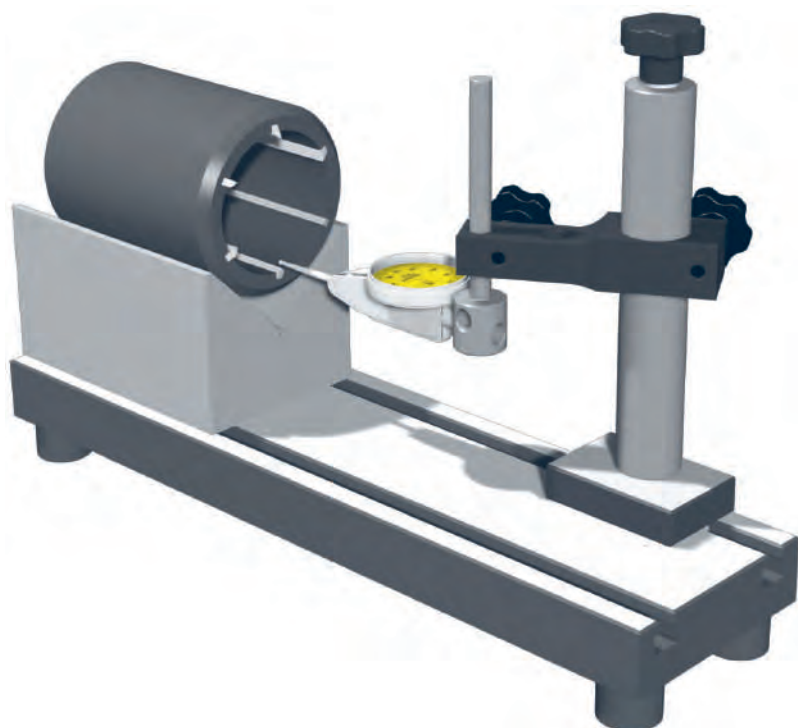


73

Version for external reamers, adjustable "V" in translation with guidance.

Ref. PMS8110

Option: Clamping on the "V"





System for the Measurement of Plug Gauges

Application

For the control of plain and threaded gauges, by high precision checking of the external dimensions :

- Diameters measurement
- Threads measurement
- Heights measurement

Intended mainly for measurement in a laboratory: for master gauge checking and calibration.

It is also possible to use in a workshop, metrology department... according to the precision of the sensor used.

Features

Straightening system allows an accurate control of the parallelism of the anvils above and below the workpiece. Precise and exact measurements are easily obtained thanks to the mechanical system of searching the reversing point.

All the precision parts are hardened and ground.

Measuring accuracy : depends on the sensor used.

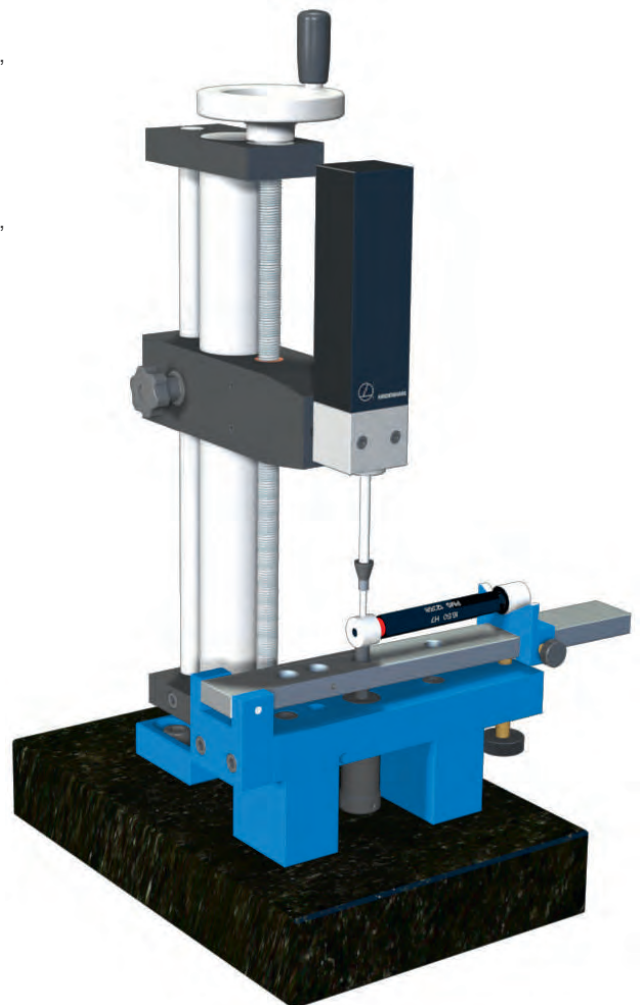
Flatness of the anvils < 0.1 μm

Accuracy of the sensor up to $\pm 0.03 \mu\text{m}$

Details

- The column and screw give double guidance for the sensor assembly,
- The smooth column for mounting the sensor is $\varnothing 40 \text{ mm}$,
- The base is Granite class 0, with a choice of dimensions (300x200, 400x250....),
- Anvils are available in standard and special forms...
- Master gauges,
- Measuring pins are available for thread measurement.

We can supply a transmitter to give the highest accuracy (Heidenhain, Sony, Mahr, Metro...)





Stand for Roughness Tester

Application

Allows the mounting of the traverse unit and makes it easy to measure in difficult areas or for units with a skidless probe system.

Currently used in workshops, metrology laboratories...

Features

Mounted onto a class DIN876/0 black granite base with a column holding the traverse unit and a linear rule as a straightening system.

Reference	Type	Column	Granite base
			(mm)
PMS8900	Mitutoyo SJ401	Double screw guides	400x250 or 500x315
PMS8901	Diavite DH7 and Compact		
PMS8902	Mitutoyo SJ201 and 301		

Fully complete and assembled stand: granite base class 0, ruler of positioning with knurled thumb wheels, column with double screw guides, advanced support unit.

Options

Column : Plain Ø25, Ø40 mm, or a double screw guide (no free play).

Granite : Class 0, with a choice of dimensions (300x200, 400x250, 500x315....).

Anti-vibration feet.

Linear rule or straightening system.

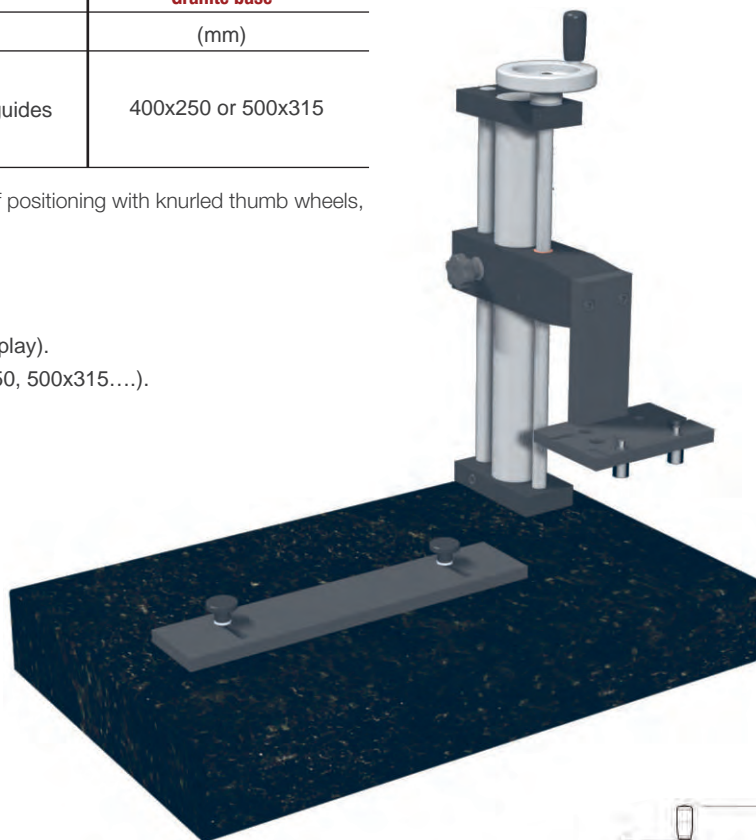
Crossed, micrometric, floating... table.

For other accessories for fixing or maintenance, please see page 108 to 110.

All the elements are available separately.

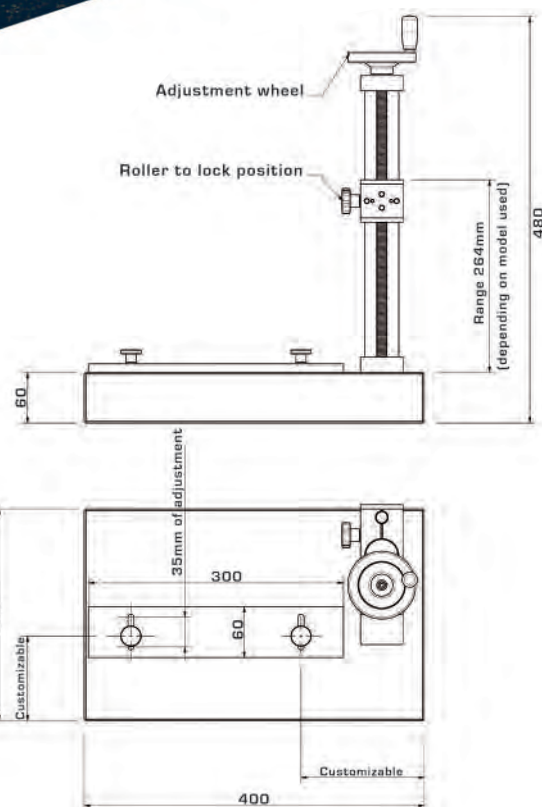
Traverse unit :

- Mitutoyo SJ401/500, SJ201/301
- Diavite DH5/6/7, Compact
- Mahr M1/M2, S1/S2, PS1, M300...
- Tesa.....



75

Reference	Type
PMS8930	Support unit for Mitutoyo SJ401
PMS8931	Support unit for Diavite
PMS8940	Guide rulers 300x60 mm

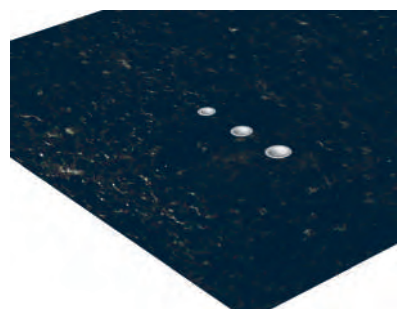


Inserts and granite drilling:

We offer various inserts and can install them in the granite (new or second hand).

For column fixing, supports, rulers...

Our standards are M6, M8, M10, drilling with counterboring...



Reference	Type
PMS8952	M6 Insert
PMS8953	M8 Insert
PMS8954	M10 Insert
PMS8956	Drilling with counterboring



Modular Accessories for “T” Slot (Keyway) Tables

Application

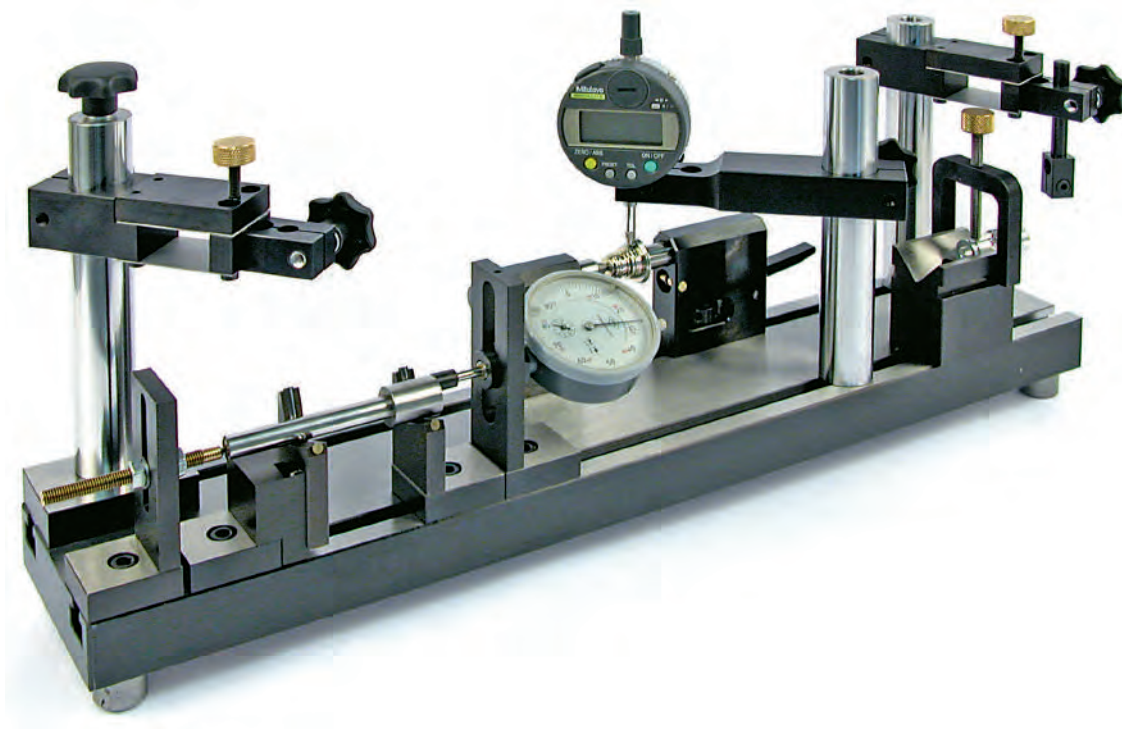
Allows you to create your inspection assembly to carry out many various tasks using standard accessories.

Currently used in workshops, metrology laboratories...

Features

All the elements have standard mounts and are assembled on the “T” slot tables with “T” slot T 8H7 or according to your application.

All the precision parts are hardened and ground.



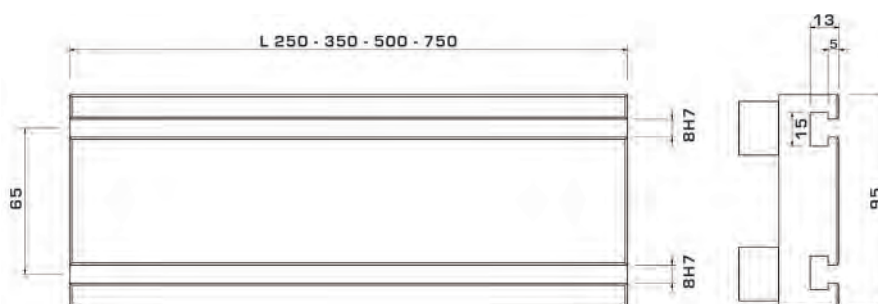
• “T” slot tables

Hardened steel

Slots are “T” size 8 H7 as standard for Gauge Pro



Reference	Working length
	(mm)
PMS2501	250
PMS2502	350
PMS2503	500
On demand	> 500

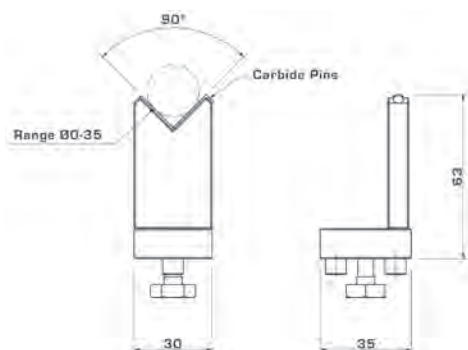




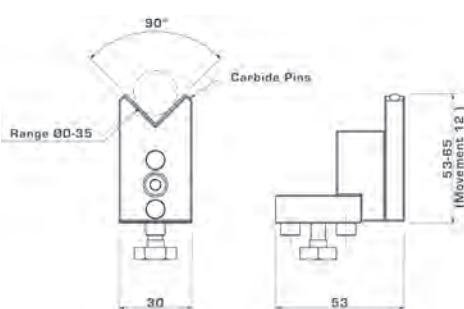
Modular Accessories for “T” Slot (Keyway) Tables

• “V”

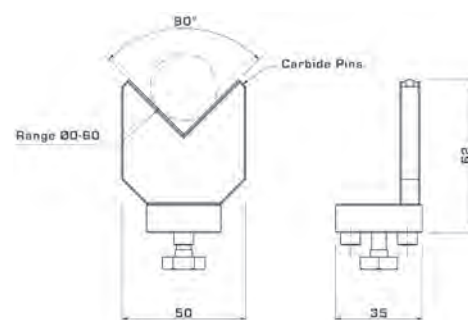
Reference	Type	Angle	Capacity Ø (mm)	Adjustable in height
PMS2101TUF	With carbide pins	90°	35	-
PMS2101TUR	With carbide pins	90°	35	OK
PMS2102TUF	With carbide pins	60°	24	-
PMS2102TUR	With carbide pins	60°	24	OK
PMS2161TUF	With carbide pins	90°	60	-
PMS2162TUF	With carbide pins	90°	90	-
PMS2151TUF	With carbide pins	90° / incline 22°30	35	-
PMS2151TUR	With carbide pins	90° / incline 22°30	35	OK
PMS2123TUF	Reduced thickness	90°	20	OK
PMS2124TUF	Reduced thickness	60°	18	OK
PMS2125TUF	Reduced thickness	90° / incline 22°30	20	-
PMS2191TU	Raise 30 mm	-	-	-



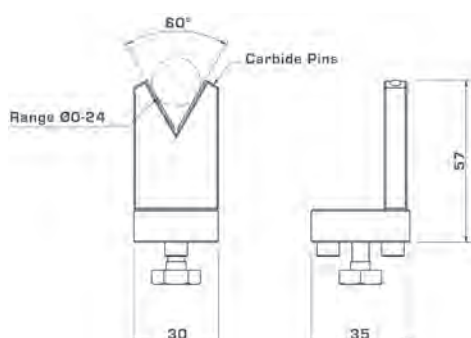
Ref. 2101TUF



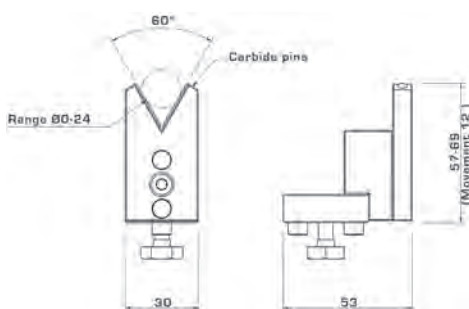
Ref. 2101TUR



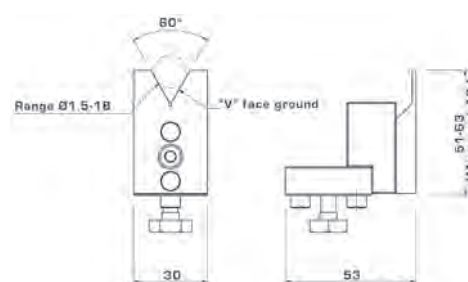
Ref. 2161TUF



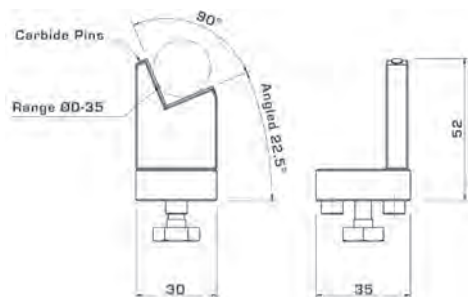
Ref. 2102TUF



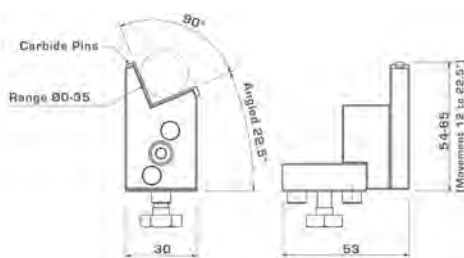
Ref. 2102TUR



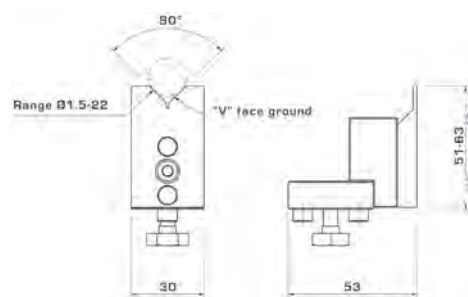
Ref. 2124TUF



Ref. 2151TUF



Ref. 2151TUR



Ref. 2123TUF

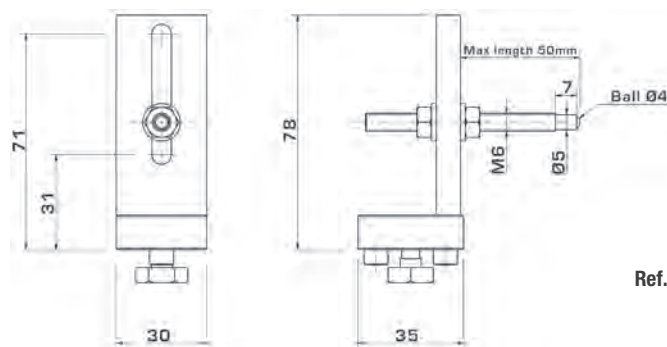
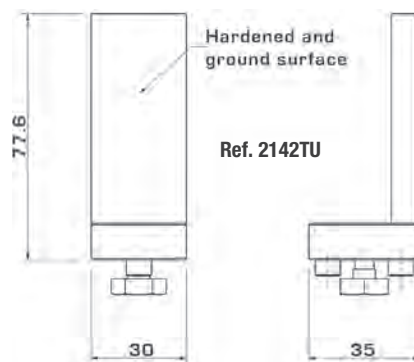
Tilted “V” of 22°30 : allows for the control of Ø and circularity. It records the Ø registered in the true section of the part plus the defect of form.



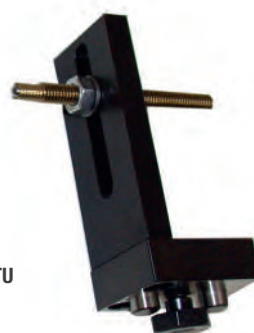
Modular Elements for "T" Slot (Keyway) Tables

• Supports / Stops

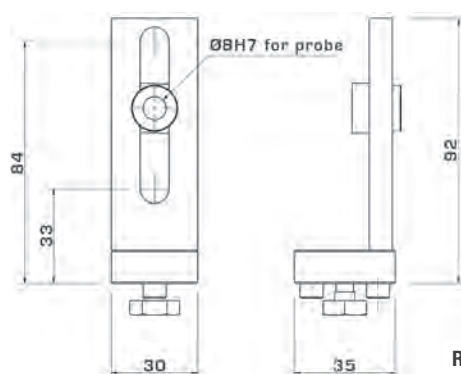
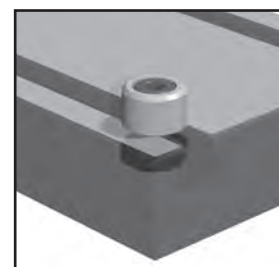
Reference	Type
PMS2140TU	Cylindrical adjustable Stop
PMS2142TU	Flat stop
PMS2143TU	End stop for TU
PMS2141TUSH	Horizontal comparator support
PMS2301TU	System for fixing with a roller



Ref. 2140TU



Ref. 2143TU



Ref. 2141TU

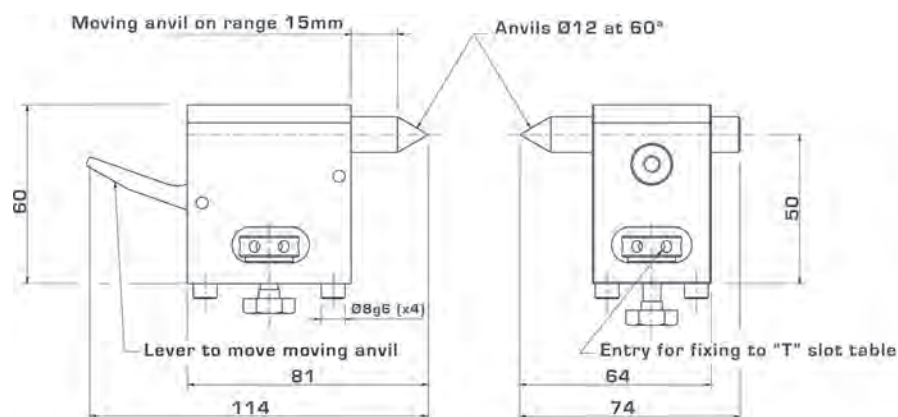
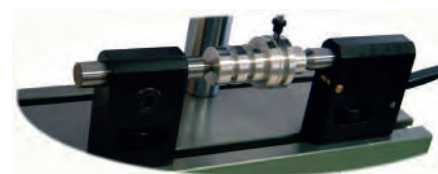


Ref. 2301TU



• Between centres (Headstock) supports

Reference	Type	Angle	Height (mm)
PMS2220TU	Between-centres anvils (pair)	60°	50
PMS2221TU	Anvils (pair)		30

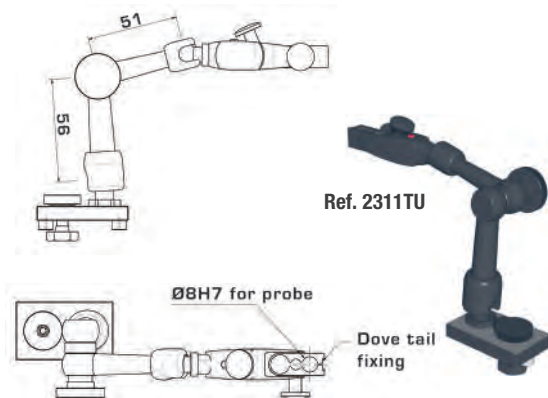




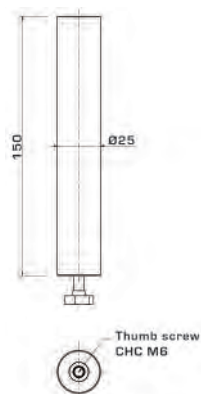
Modular Elements for “T” Slot (Keyway) Tables

• Columns

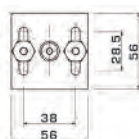
Reference	Type	Ø	Height	Locking
		(mm)	(mm)	
PMS2010TU	Fixed	25	150	Key
PMS2011TUR	Transverse Adjustment	25	160	Key
PMS2012TURA	Sliding guide with stop	25	160	Button
PMS2311TU	Articulated arm guide (= column + arm)	-	178 (56x51x71)	Button
PMS2320TU	Linear guide + column		Length to be specified	



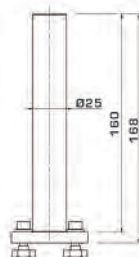
Ref. 2311TU



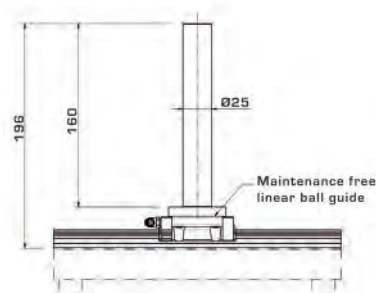
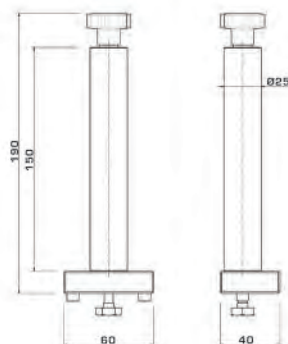
Ref. 2010TU



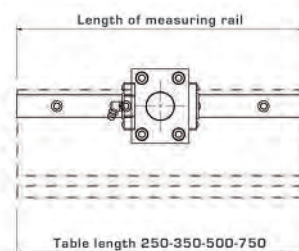
Ref. 2011TUR



Ref. 2012TURA



Ref. 2320TU



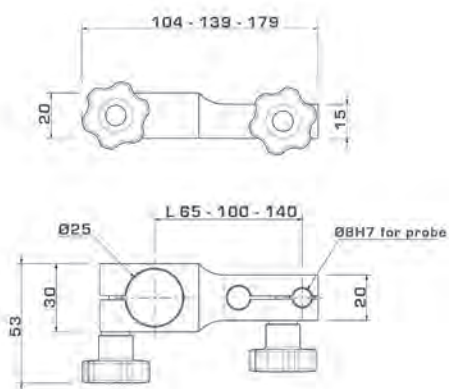
79

• Arms

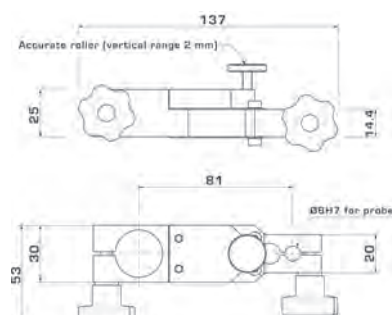
Reference	Type	Distance between centres	Boring Ø
		(mm)	(mm)
PMS2001S	Standard	65	25H7 / 8H7
PMS2002S	Standard	100	25H7 / 8H7
PMS2003S	Standard	140	25H7 / 8H7
PMS2006RF	Adjustable stop	80	25H7 / 8H7



Ref. 2006RF



Ref. 2001-2003S





Modular Elements for "T" Slot (Keyway) Tables

• Examples of application

Between-centre's bench

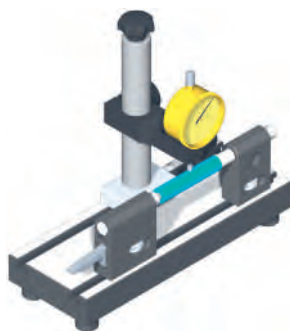
Inspects concentricity errors, circularity, squareness of faces...

"T" slot table PMS2501

A pair of between centre's anvils PMS2220TU

Column 2012TURA

Arm 2001S



Between-centre's with linear guide

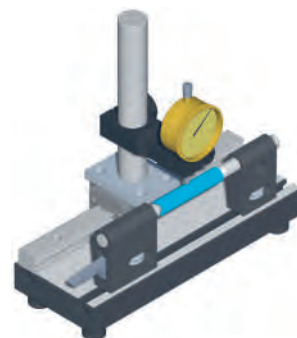
Inspects concentricity errors, circularity, squareness of faces...+ inspects straightness

"T" slot table PMS2501

A pair of between centre's PMS2220TU

Rail + Column 2320TU

Arm 2001S



"V" with clamp

Inspects concentricity errors, circularity, squareness of faces...

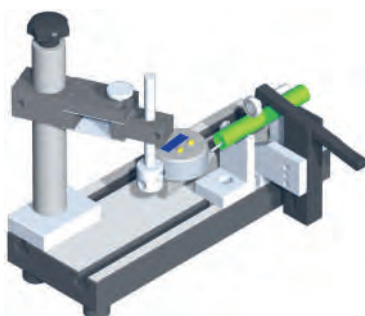
"T" slot table PMS2501

Pair of "V"s PMS2101TUF

Clamping roller PMS2301TU

Column 2012TURA

Arm 2006RF



Reduced thickness "V"s with linear guide

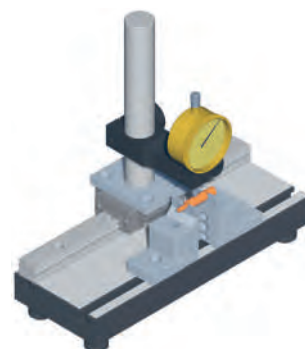
Inspects concentricity errors, circularity, squareness of faces, straightness...for small parts or little steps "T" slot

Table PMS2501

Pair of "V"s PMS2124TUER

Rail + Column 2320TU

Arm 2001S



Adjustable "V"s with linear guide

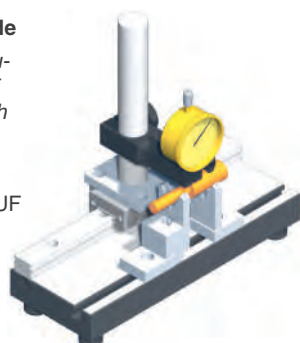
Inspects concentricity errors, circularity, triangulation, squareness of faces, straightness... for parts with shoulders

"T" slot table PMS2501

"V"s PMS2102TUR + PMS2102TUF

Rail + Column 2320TU

Arm 2001S



"V"s with clamping and linear guide

Inspects concentricity errors, circularity, squareness of faces, straightness...

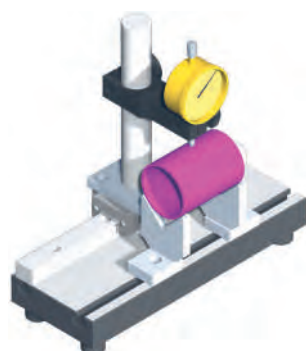
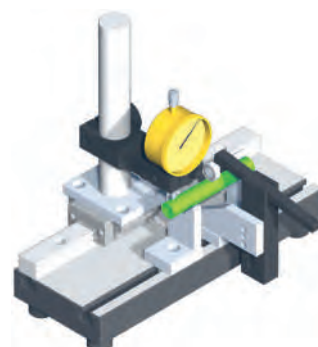
"T" slot table PMS2501

Pair of "V"s PMS2101TUF

Clamp with roller PMS2301TU

Rail + Column 2320TU

Arm 2001S



Large capacity "V"s with linear guide

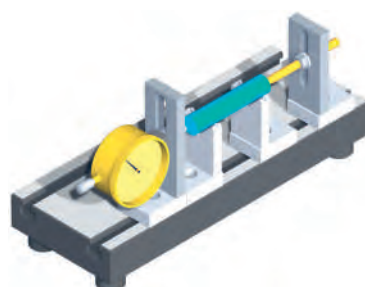
Inspects concentricity errors, circularity, squareness of faces, straightness...for large diameter parts

"T" slot table PMS2501

Pair of "V"s PMS2101TUF

Rail + Column 2320TU

Arm 2001S



"V"s with stop and axial measurement

Inspects squareness of faces and length

"T" slot table PMS2501

Pair of "V"s PMS2101TUF

Support 2141TUSH

Stop 2140TU

Angled adjustable "V"s with linear guide

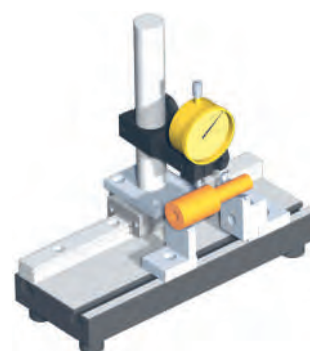
Inspects Ø, concentricity errors, circularity, squareness of faces, straightness... for parts with shoulders

"T" slot table PMS2501

"V"s PMS2151TUF + PMS2151TUR

Rail + Column 2320TU

Arm 2001S





Columns and Arms

• Column with double screw guides

Columns are made from chromium steel and ground, with double guides for optimal rigidity.

The connection Ø 8H7 makes it possible to mount comparators, sensors or to fix other accessories. It can be used with the arm specified for Ø 40 columns.

There are four tappings on the face for mounting Heidenhain equipment

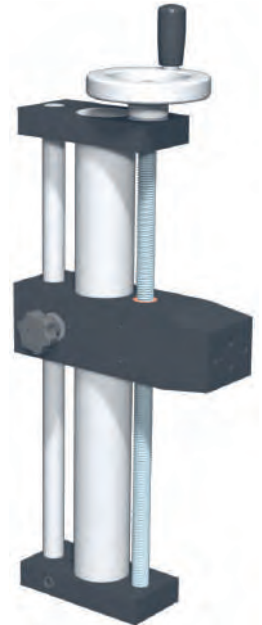
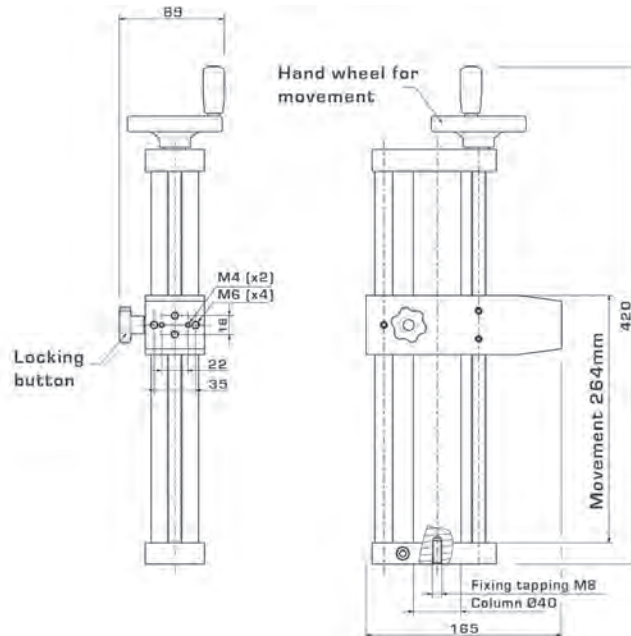
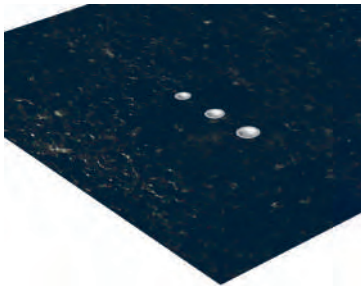
Uses: as a support for surface finish meters, Heidenhain transmitters, as supports for comparators...

Reference	Type	Movement
		(mm)
PMS3550	Column with double screw guides	264
PMS3555	Adaptation Ø 8H7	-

Insert making - Drilled granite base

We carry out the installation of the inserts into the granite base (new and second hand). These are for fixing columns, supports, rulers... Our standards are M6, M8, M10...

See page 75



81

• Smooth columns

Columns are made from chromium steel and ground, tapped with M8.

Reference	Type (mm)	Ø (mm)	Lenght
PMS3502	Smooth Column, chrome	25	250
PMS3504	Smooth Column, chrome	25	350
PMS3506	Smooth Column, chrome	25	500
PMS3520	Smooth Column, chrome	40	350

Other Ø and lengths upon request



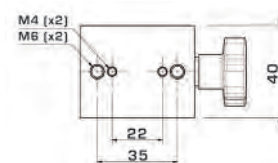
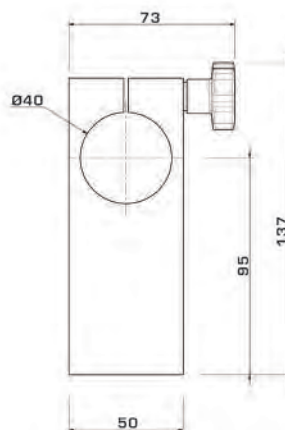
• Arms for Ø 40 columns

Assembles onto Ø 40 columns.

There are four tapping's on the face for mounting Heidenhain equipment

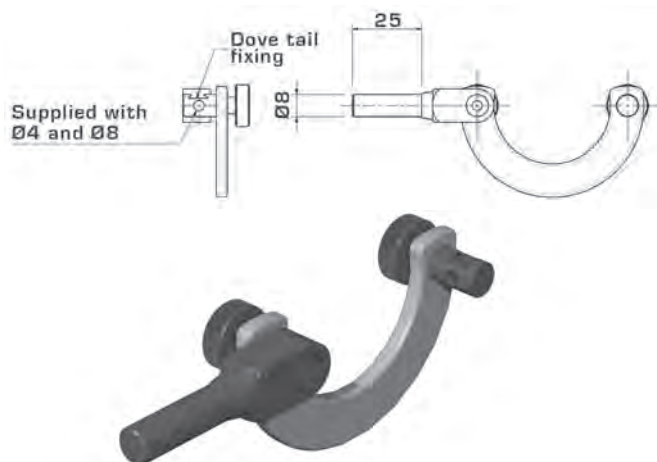
For Ø 25 columns, please see the arms on page 77

Reference	Type
PMS2005	Arm Ø 40
PMS3555	Adaptation for Ø 8H7

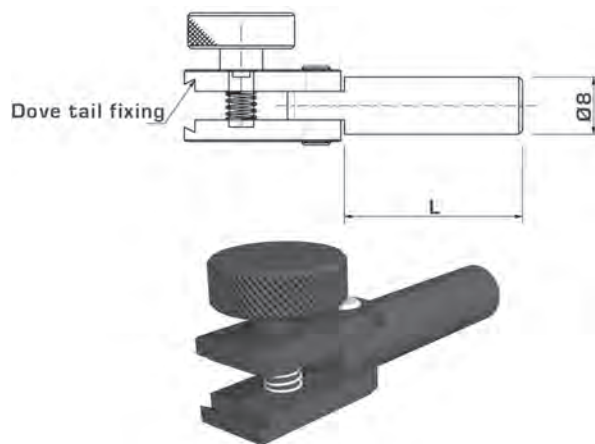




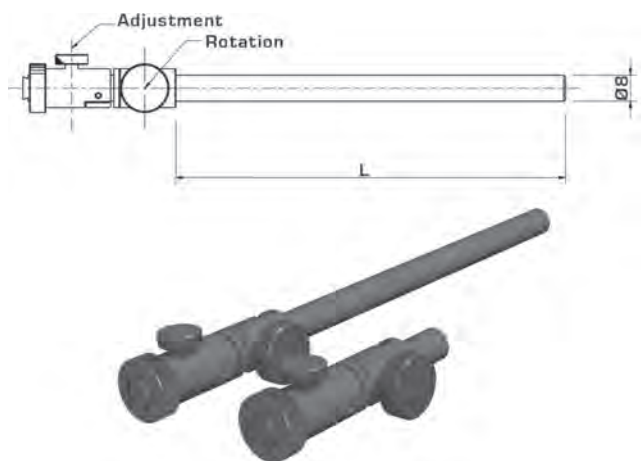
Accessories for Fixing the Work Piece



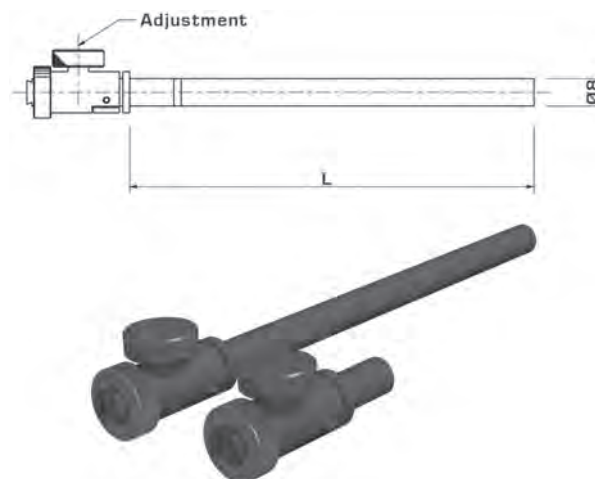
Reference	Type
PMS1820	Support for centring Ø 4, Ø 8 with dove tail



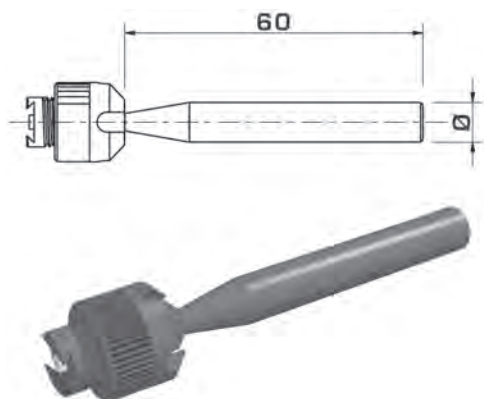
Reference	Type
PMS1821	Short directional support (L 25 mm)
PMS1822	Long directional support (L 90 mm)



Reference	Type
PMS1825	Short directional support with adjustable end (L 15 mm)
PMS1826	Long directional support with adjustable end (L 120 mm)



Reference	Type
PMS1823	Short support with adjustable end (L 15 mm)
PMS1824	Long support with adjustable end (L 120 mm)



Reference	Type
PMS1827	Support with ball end Ø 8
PMS1828	Support with ball end Ø 6



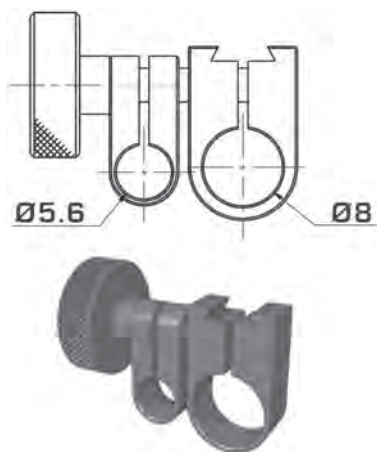
Reference	Type
PMS1840	Attachment for directional fixing Ø 8 / Ø 8





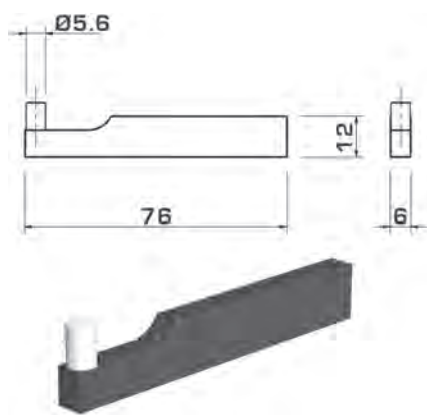
Accessories for Fixing the Work Piece

Reference	Type
PMS1800	Support for indicator with lever Ø 8 ring clamp
PMS1801	Support for indicator with lever Ø 4 ring clamp
PMS1805	Support for indicator with lever Ø 8
PMS1806	Support for indicator with lever Ø 6
PMS1807	Support for indicator with lever Ø 4
PMS1810	Support for indicator with directional lever Ø 8 ring clamp
PMS1811	Support for indicator with directional lever Ø 4 ring clamp
PMS1815	Support for indicator with rotating lever Ø 4 Tail Ø 8 Long. 25 mm



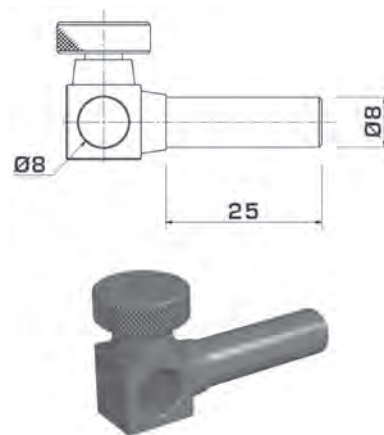
Exist in Ø 6 / Ø 8

Reference	Type
PMS1841	Attachment for directional fixing Ø 5.6 / Ø 8

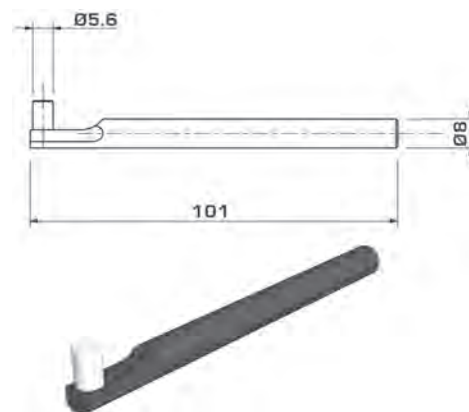


Reference	Type
PMS1846	Prism support 12x6

Directional support : Add PMS1846 or 1847 with the fixing PMS1841



Reference	Type
PMS1845	Square support Ø 8



Reference	Type
PMS1847	Cylindrical support Ø 8



Multi-Point Measuring Systems

Application

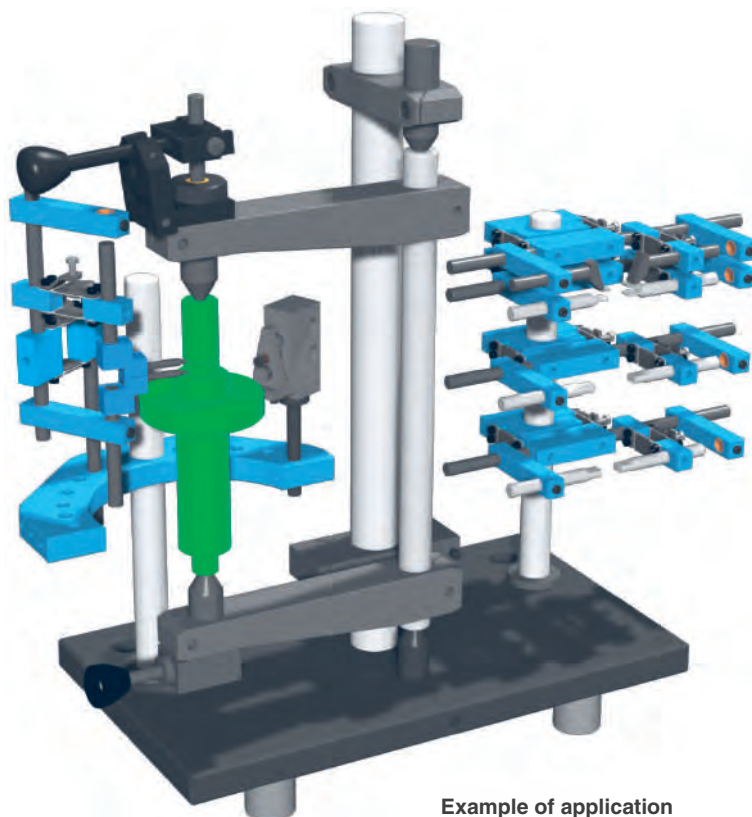
Allows you to create a complete inspection system using only standard multi-use accessories.

Currently used in workshops, metrology laboratories...

All the precision parts are hardened and ground.

We can assist in the selection of the accessories necessary to achieve your inspection assembly.

We can manufacture the master gauges corresponding to your requirements.



Example of application

• Multi-point assembly



Reference	Type
PMS1100	Double swiveling Multicote

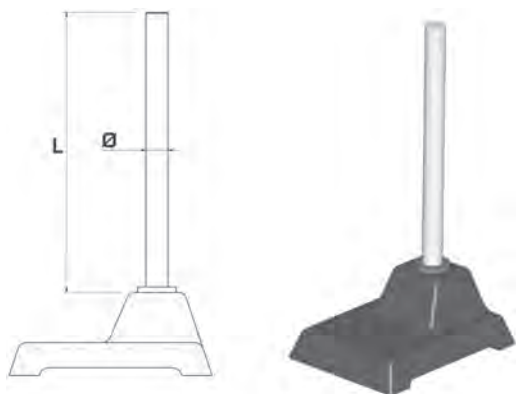


Reference	Type
PMS1101	Simple swiveling Multicote

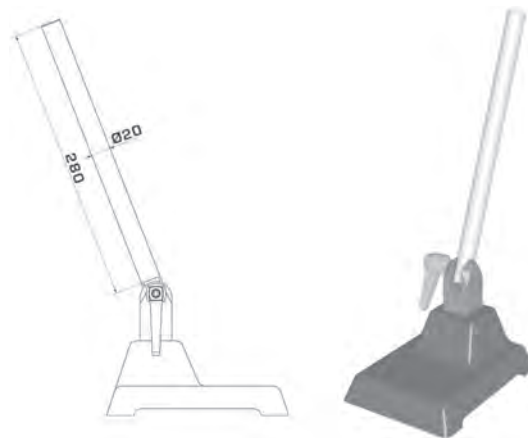


Multi-Point Measuring Systems

• Column unit

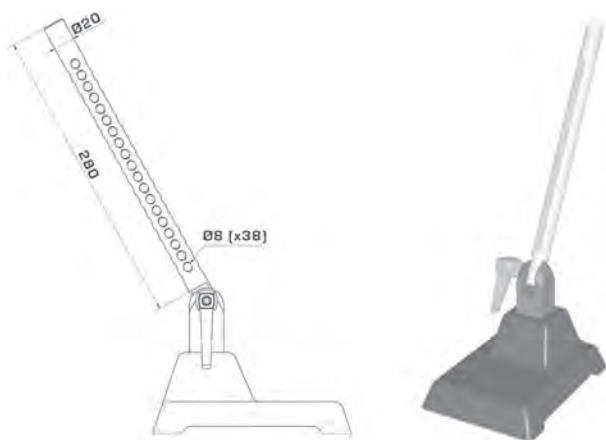


Reference	Type
PMS1110	Base + plain column Ø 20 L 250 mm
PMS1111	Base + plain column Ø 20 L 400 mm
PMS1112	Base + plain column Ø 20 L 300 mm

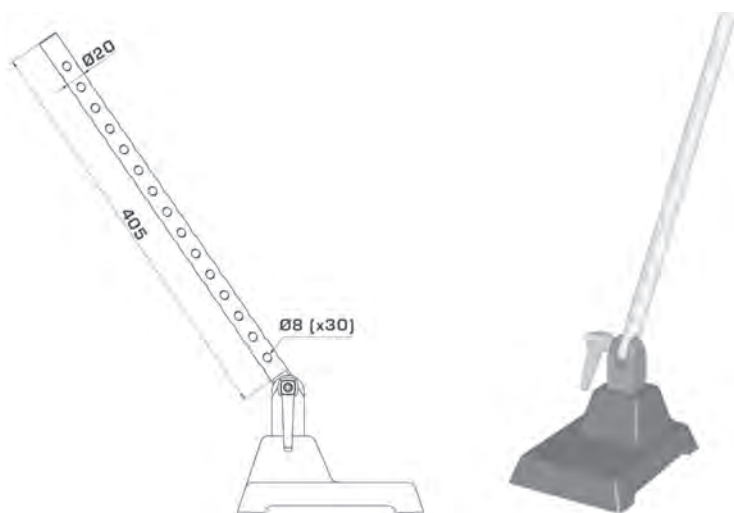


Reference	Type
PMS1113	Base + plain column L 280 mm directional

85



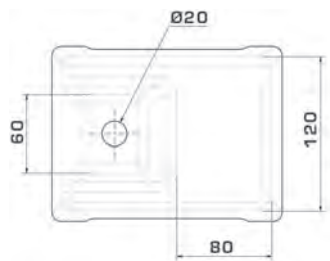
Reference	Type
PMS1114	Base + drilled column L 280 mm directional



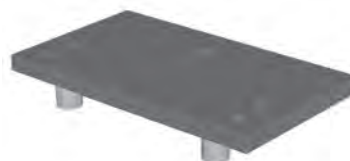
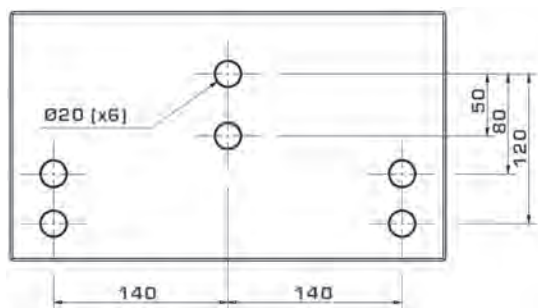
Reference	Type
PMS1115	Base + drilled column L 405 mm directional



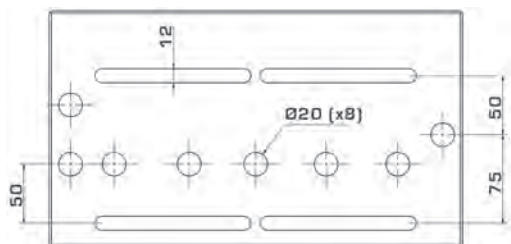
• Base



Reference	Type
PMS1200	Base for column



Reference	Type
PMS1201	Support table 6 X Ø 20



Reference	Type
PMS1202	Support table 8 X Ø 20

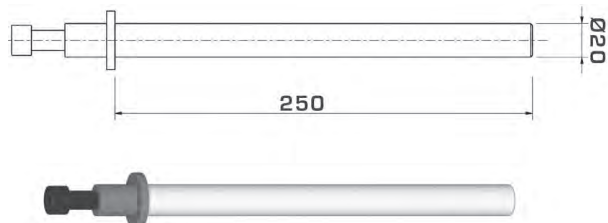


Multi-Point Measuring Systems

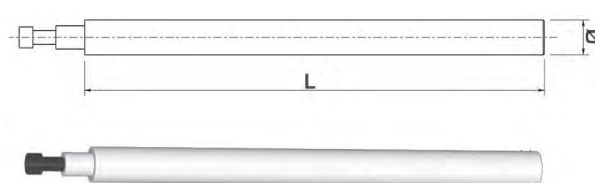
• Column

Material :

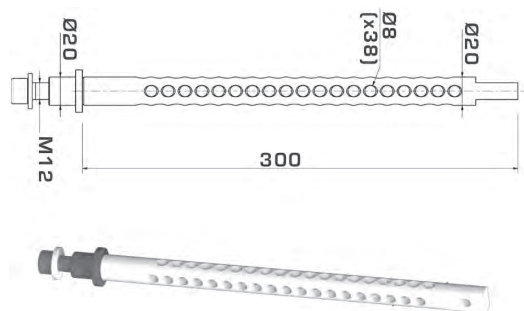
Chromium steel



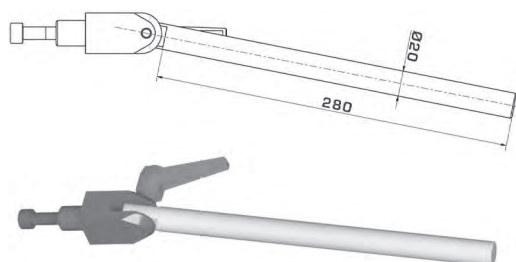
Reference	Type
PMS1210	Plain column L 250 Ø 20



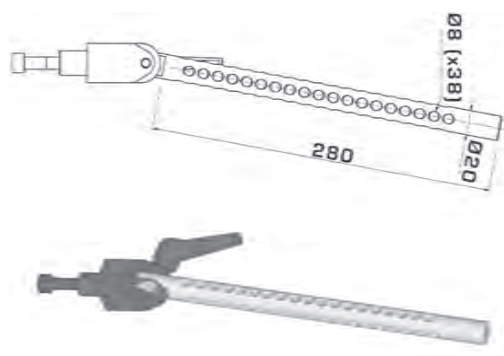
Reference	Type
PMS1211	Plain column L 400 Ø 30
PMS1212	Plain column L 600 Ø 30
PMS1213	Plain column L 300 Ø 35
PMS1214	Plain column L 600 Ø 35



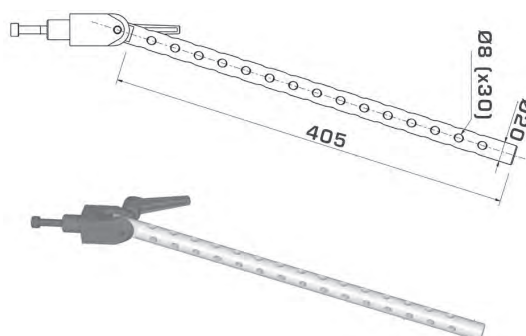
Reference	Type
PMS1215	Fixed drilled column L 300 mm



Reference	Type
PMS1220	Plain directional column L 280 mm



Reference	Type
PMS1221	Directional drilled column L 280 mm

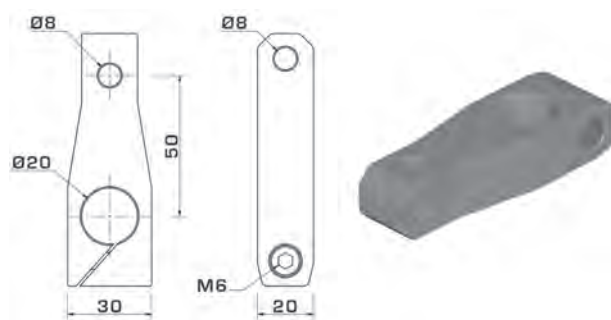


Reference	Type
PMS1222	Directional drilled column L 405 mm

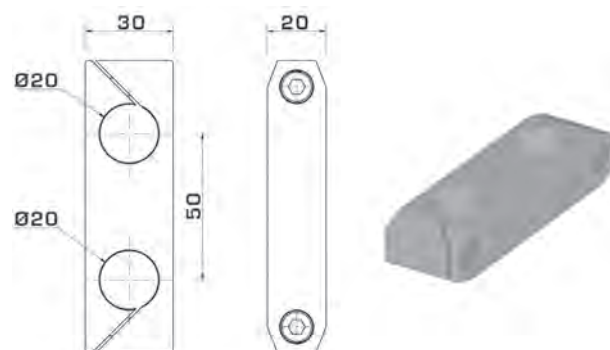


Multi-Point Measuring Systems

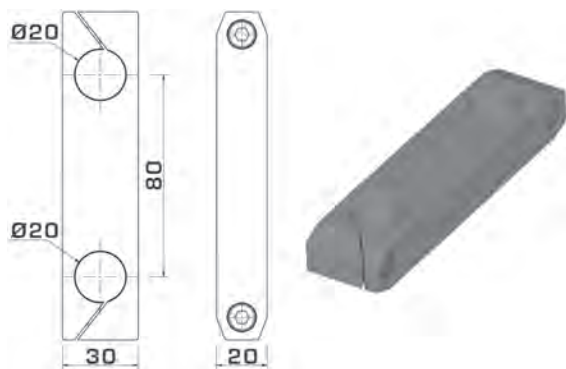
• Arms



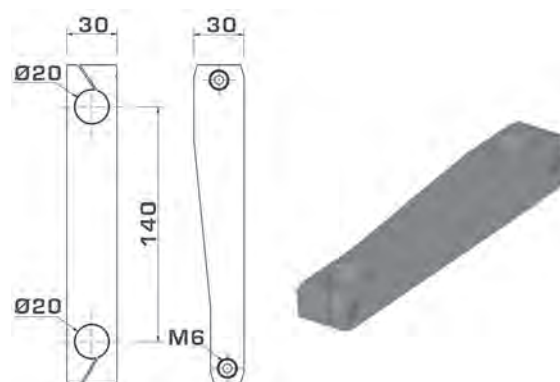
Reference	Type
PMS1230	Arm Ø 20 / 8 L 50



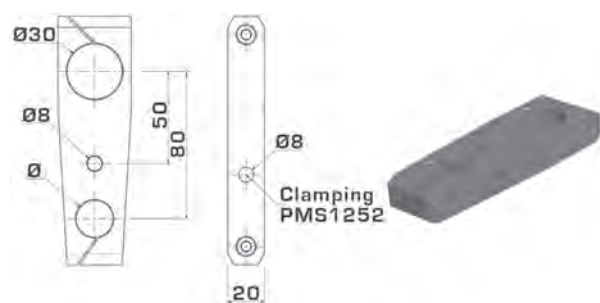
Reference	Type
PMS1231	Arm Ø 20 / 20 L 50



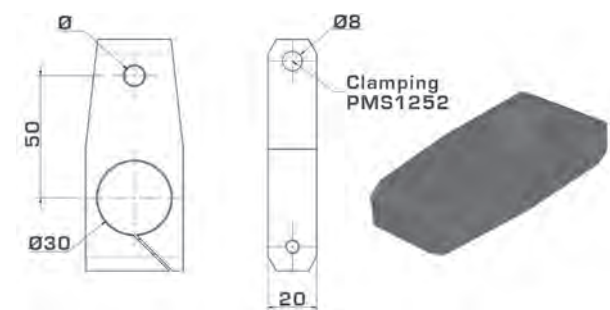
Reference	Type
PMS1232	Arm Ø 20 / 20 L 80



Reference	Type
PMS1233	Arm Ø 20 / 20 L 140



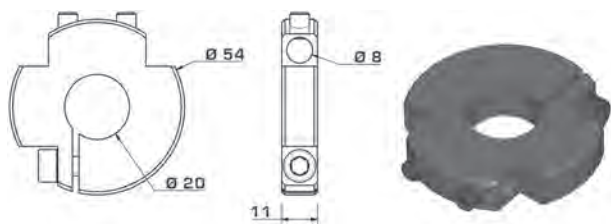
Reference	Type
PMS1234	Arm Ø 20 / Ø 30 L 80
PMS1235	Arm Ø 20 / Ø 30 L 100
PMS1236	Arm Ø 20 / Ø 30 L 120
PMS1237	Arm Ø 8 / Ø 30 L 100



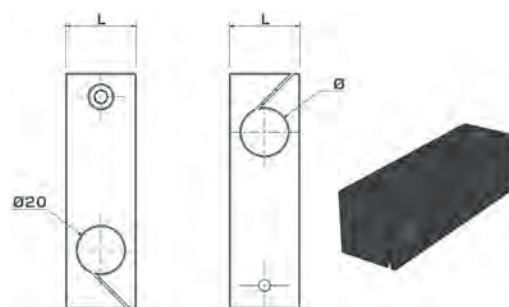
Reference	Type
PMS1238	Arm Ø 8 / Ø 30 L 50
PMS1239	Arm Ø 20 / Ø 30 L 50



Multi-Point Measuring Systems

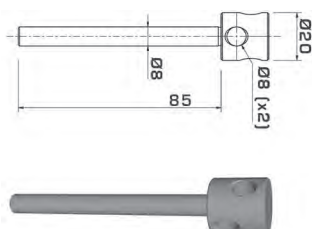


Reference	Type
PMS1245	Attachment for Ø 8 up to Ø 20

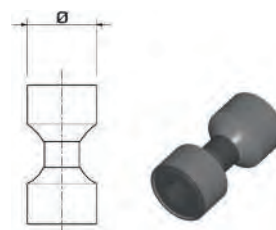


Reference	Type
PMS1240	90° Arm Ø 20 L 30
PMS1241	90° Arm Ø 30 L 40
PMS1242	90° Arm Ø 30 L 45

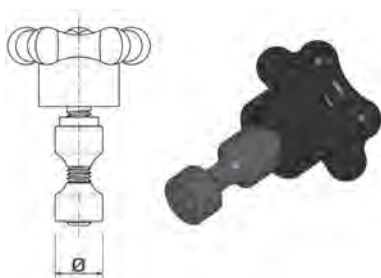
• Accessories



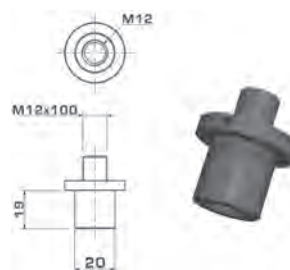
Reference	Type
PMS1250	P8



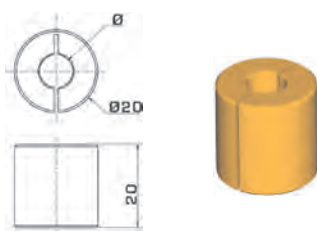
Reference	Type
PMS1251	Tightening nut Ø 8
PMS1252	Tightening nut Ø 12



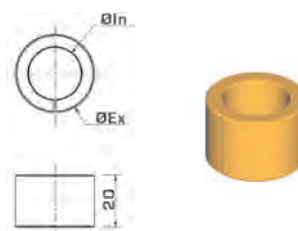
Reference	Type
PMS1253	Tightening handle Ø 8 with button
PMS1254	Tightening handle Ø 12 with button



Reference	Type
PMS1255	Adapter Ø 20 to M12 x 100



Reference	Type
PMS1256	Reducer Ø 20 / 8



Reference	Type
PMS1257	Reducer Ø 30 / 20

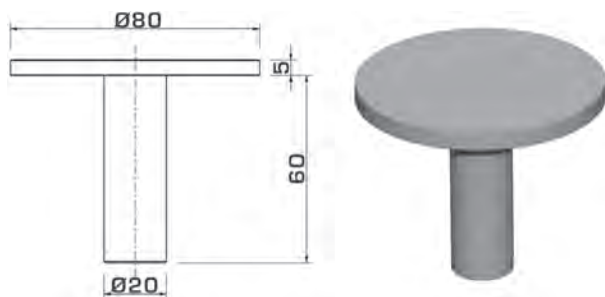


Multi-Point Measuring Systems

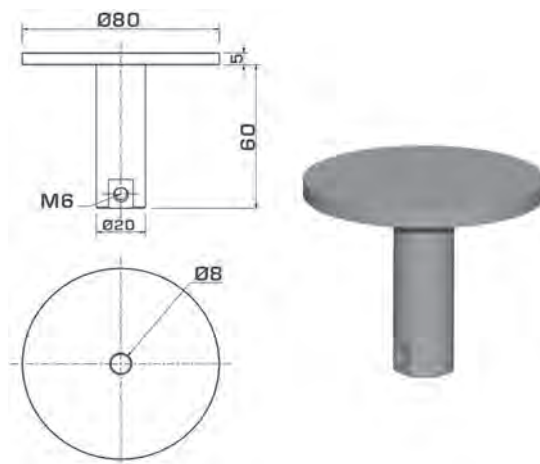
• Table

Material :

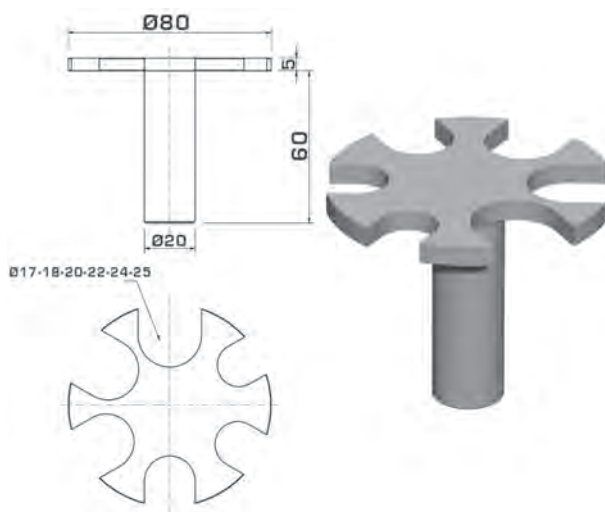
Hardened steel



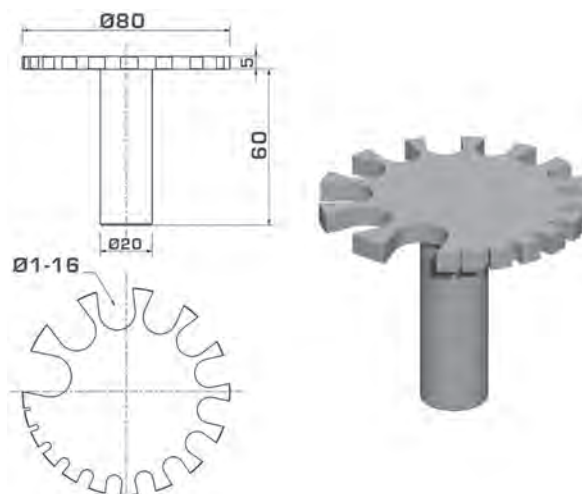
Reference	Type
PMS1260	Table Ø 80 plain



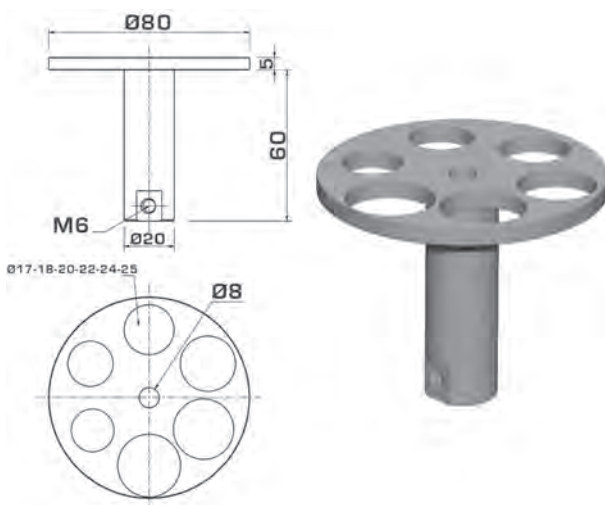
Reference	Type
PMS1261	Table Ø 80 with hole Ø 8



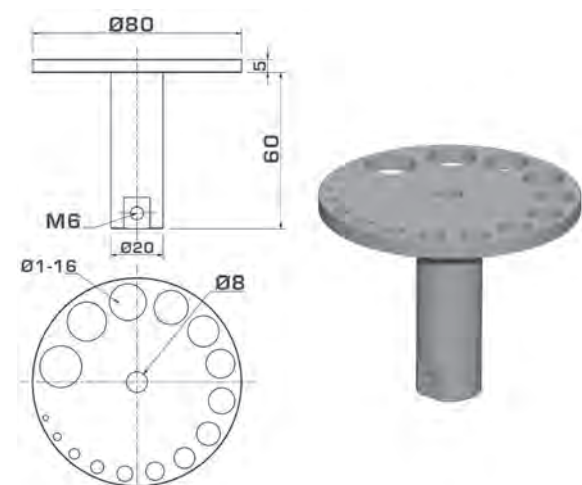
Reference	Type
PMS1262	Table with open holes Ø 17 to 25 mm



Reference	Type
PMS1263	Table with open holes Ø 1 to 16 mm



Reference	Type
PMS1264	Table with holes Ø 17 to 25 mm



Reference	Type
PMS1265	Table with holes Ø 1 to 16 mm

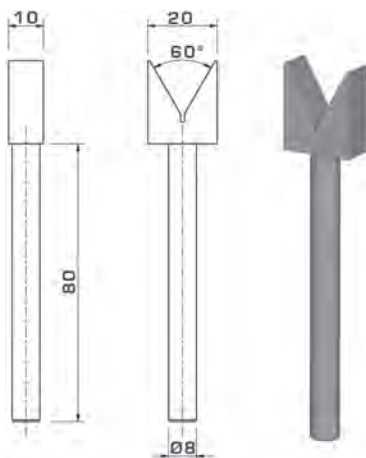


Multi-Point Measuring Systems

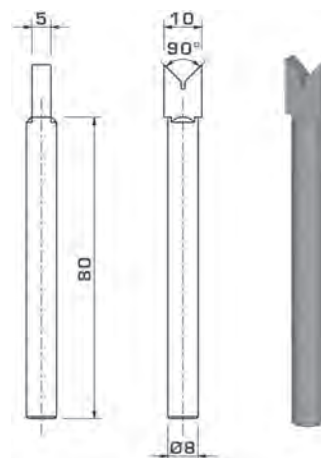
• “V” support

Material :

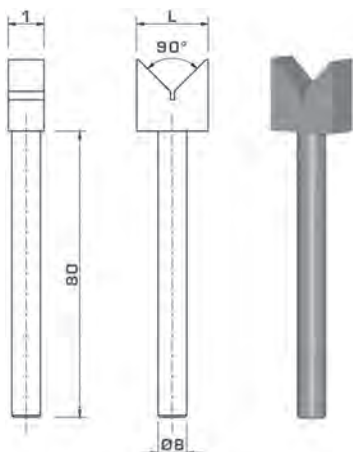
Hardened steel (Carbide on request)



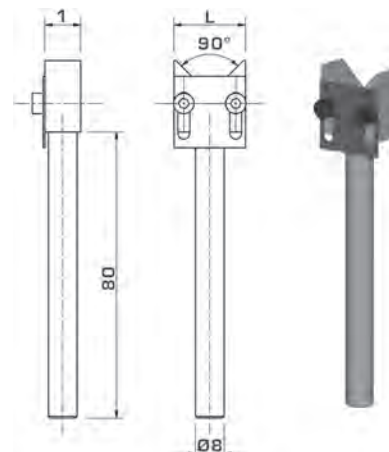
Reference	Type
PMS1270	“V” 60° L 20



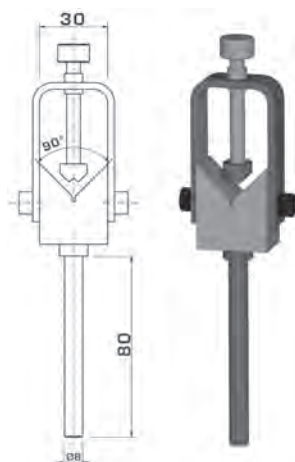
Reference	Type
PMS1271	“V” 90° L10 thickness 5



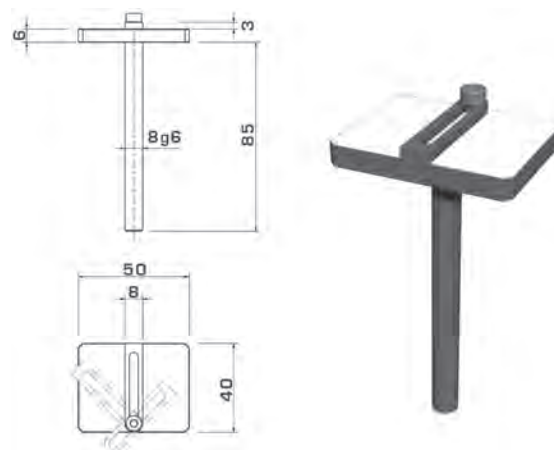
Reference	Type
PMS1272	“V” 90° L10 thickness 10
PMS1273	“V” 90° L10 thickness 20



Reference	Type
PMS1274	“V” 90° L 20 thickness 10 with stop
PMS1275	“V” 90° L 30 thickness 10 with stop



Reference	Type
PMS1276	“V” 90° with clamp L 30

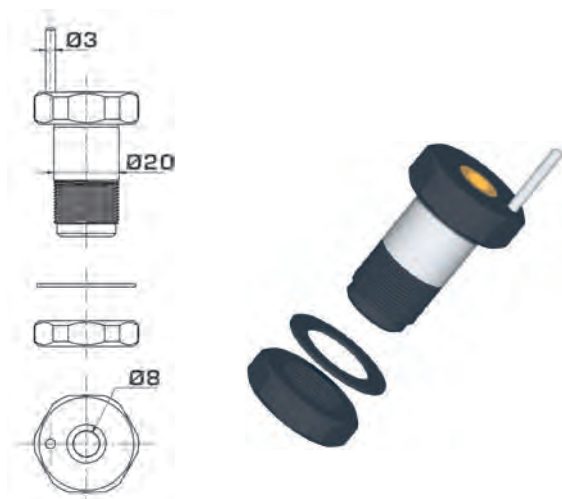


Reference	Type
PMS1266	Rectangular table 50x40

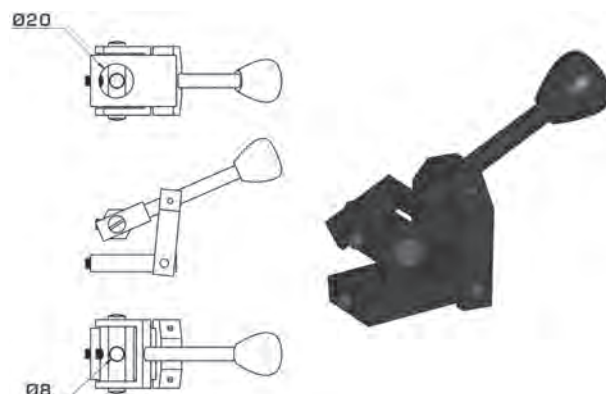


Multi-Point Measuring Systems

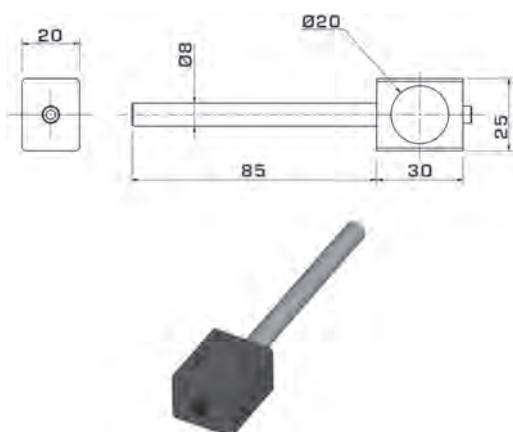
• Between centre's anvils



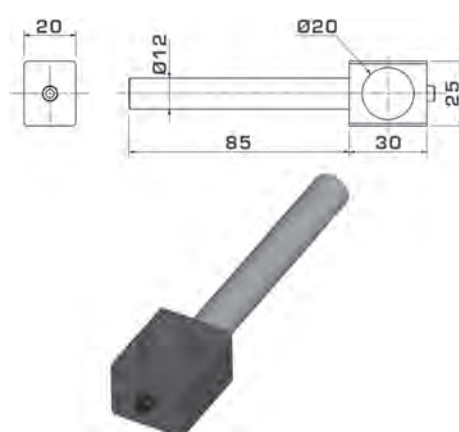
Reference	Type
PMS1300	Between centres support



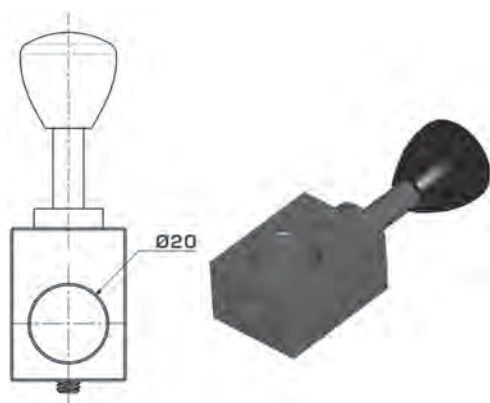
Reference	Type
PMS1301	Lever to lift clamping anvil



Reference	Type
PMS1302	Support Ø 8 with hole Ø 20



Reference	Type
PMS1303	Support Ø 12 with hole Ø 20



Reference	Type
PMS1304	Lever with hole Ø 20

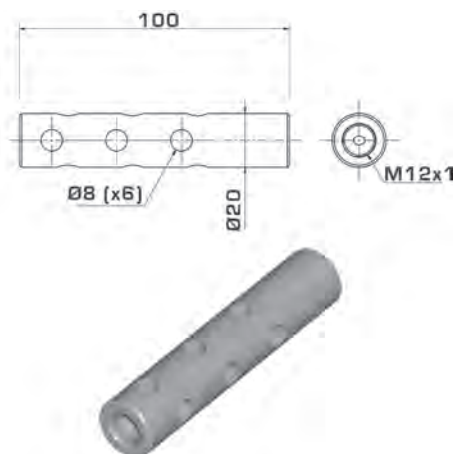


Reference	Type
PMS1310	Point 60° Ø 8 L 60 hardened steel
PMS1311	Point 60° Ø 8 L 120 hardened steel

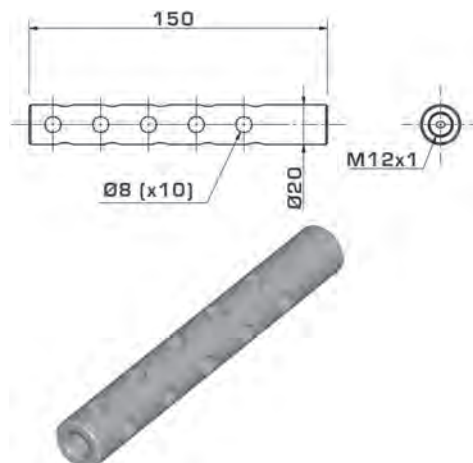




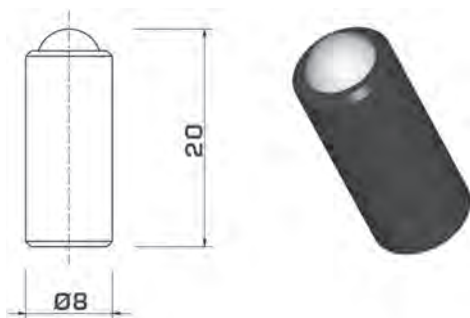
Multi-Point Measuring Systems



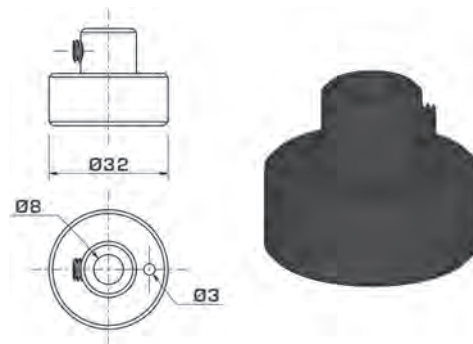
Reference	Type
PMS1305	Drilled Cylinder L 100 mm



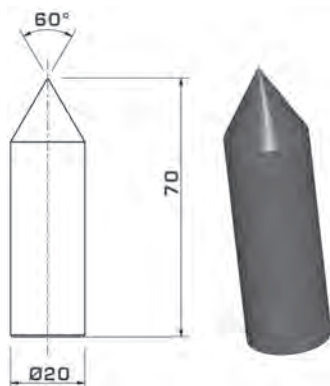
Reference	Type
PMS1306	Drilled Cylinder L 150 mm



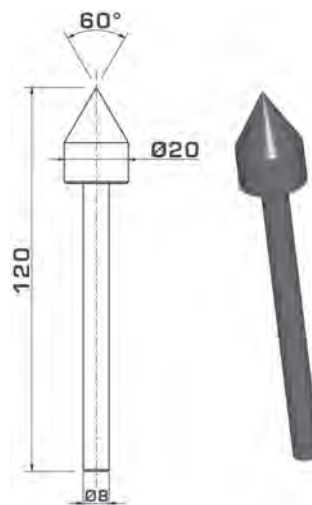
Reference	Type
PMS1307	Indexing finger



Reference	Type
PMS1308	Knurled hand wheel Ø 8



Reference	Type
PMS1312	Point 60° taper on Ø 20 hardened steel
PMS1312-H	Point 60° taper on Ø 20 carbide

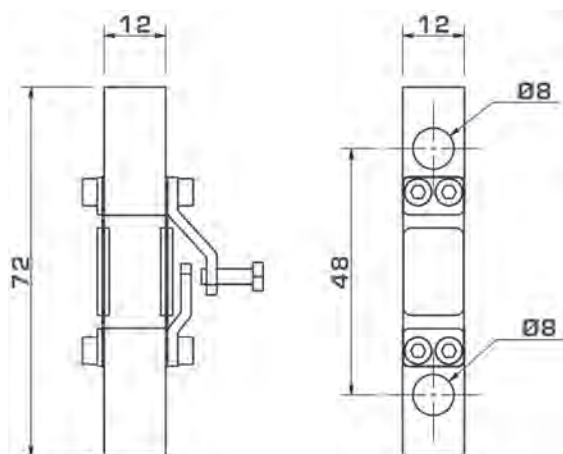


Reference	Type
PMS1313	Point 60° Ø 20 on Ø 8 hardened steel
PMS1313-H	Point 60° Ø 20 on Ø 8 carbide

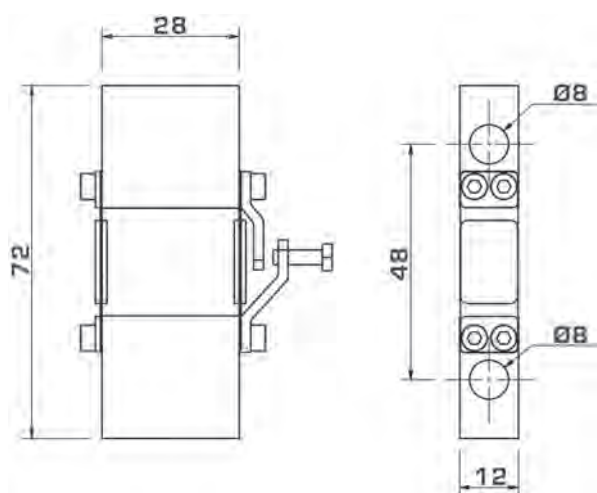


Multi-Point Measuring Systems

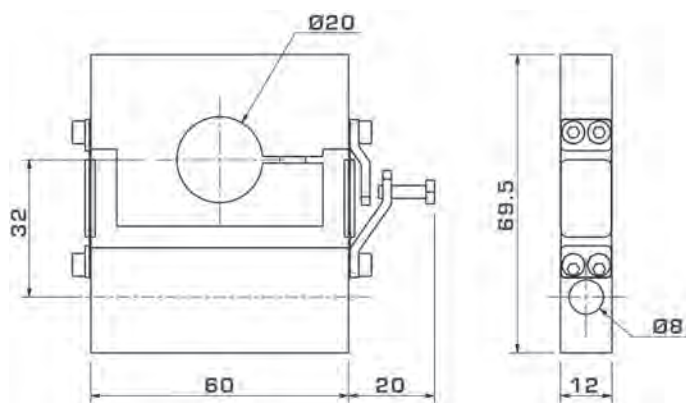
- Multi-point measuring systems



Reference	Type
PMS1400	Floating component L 12



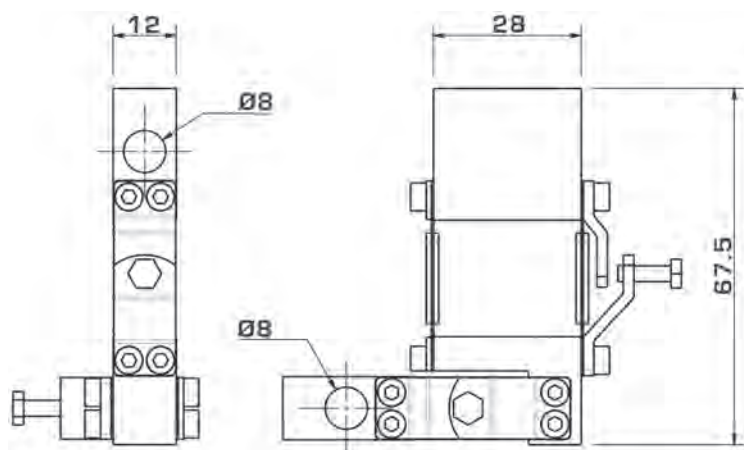
Reference	Type
PMS1401	Floating component L 28



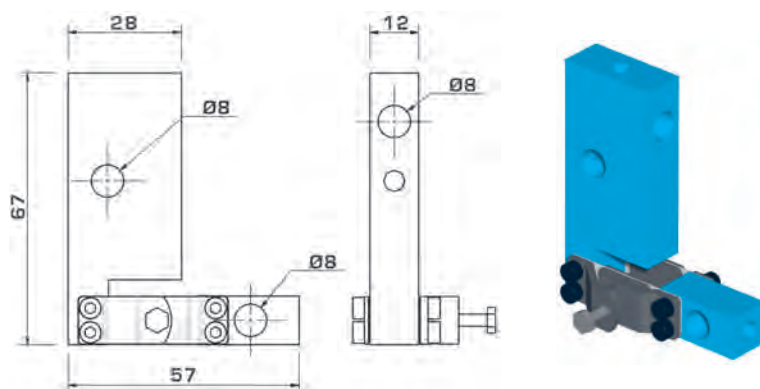
Reference	Type
PMS1402	Forked support



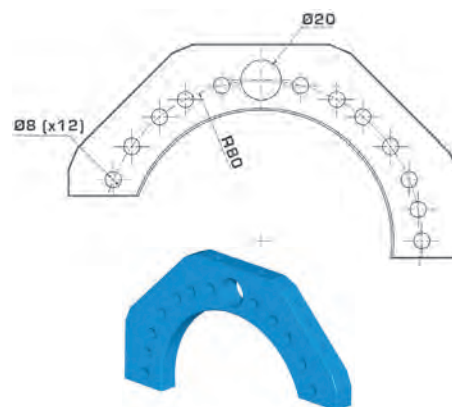
Multi-Point Measuring Systems



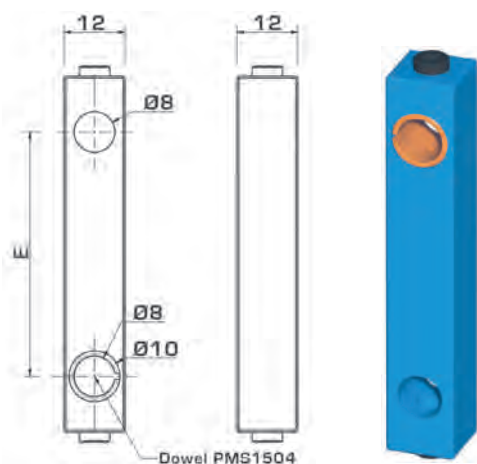
Reference	Type
PMS1403	Double floating component L 28



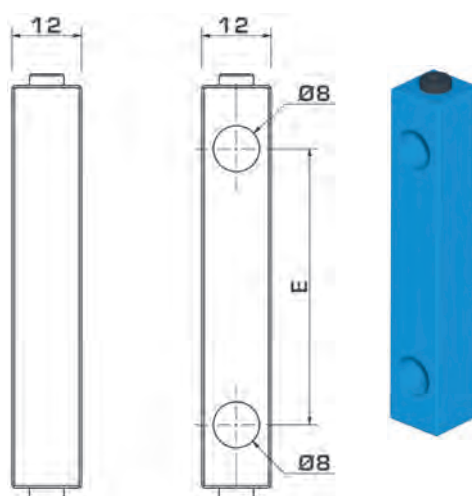
Reference	Type
PMS1404	Vertical floating component L 12



Reference	Type
PMS1410	Floating carrier arm



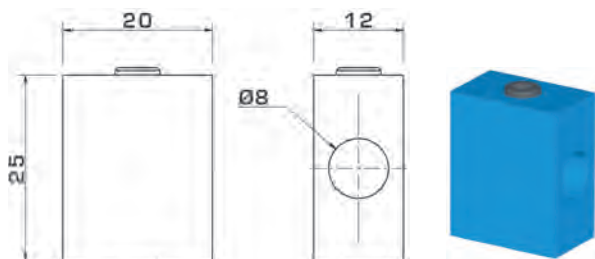
Reference	Type
PMS1420	Tester holder Ø 8 / 10 Hole centres 48
PMS1421	Tester holder Ø 8 / 10 Hole centres 24



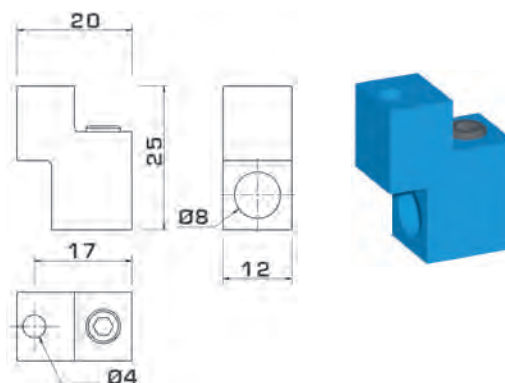
Reference	Type
PMS1422	Spacer Ø 8 Hole centres 48
PMS1423	Spacer Ø 8 Hole centres 24



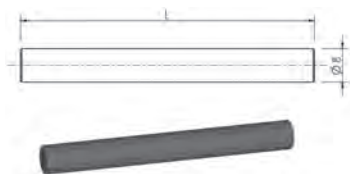
Multi-Point Measuring Systems



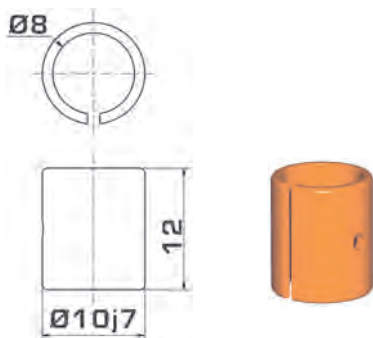
Reference	Type
PMS1424	Centre support Ø 8



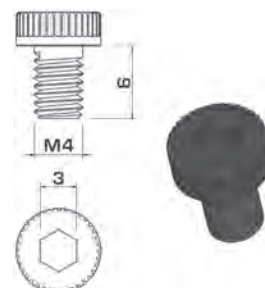
Reference	Type
PMS1425	Support Ø 8 / 4



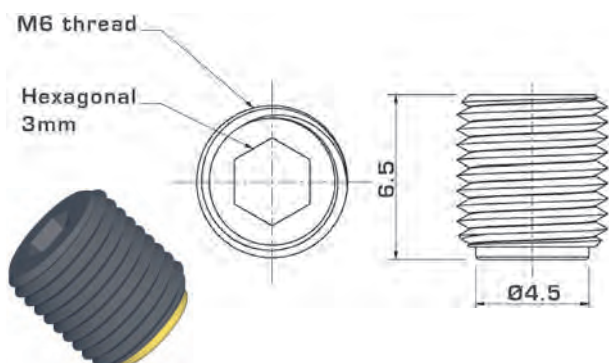
Reference	Type
PMS1430	Extension bar Ø 8 L 70
PMS1431	Extension bar Ø 8 L 90
PMS1432	Extension bar Ø 8 L 110
PMS1433	Extension bar Ø 8 L 150
PMS1434	Extension bar Ø 8 L 220
PMS1435	Extension bar Ø 8 L 250



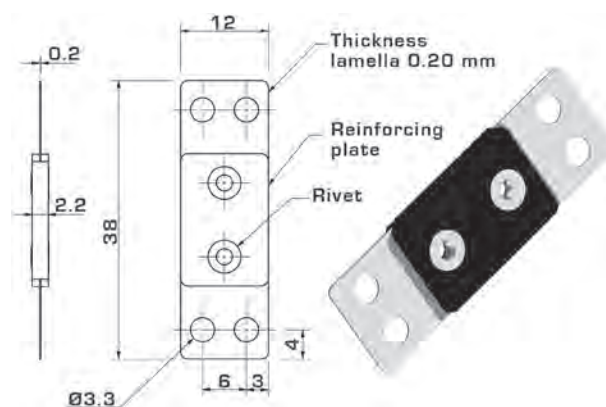
Reference	Type
PMS1450	Dowel Ø 10 / 8 H7 for tightening equipment



Reference	Type
PMS1451	Thumb screw for tightening dowels M4



Reference	Type
PMS1452	Brass grub screw M6



Reference	Type
PMS1460	Flexible plate (replacement)

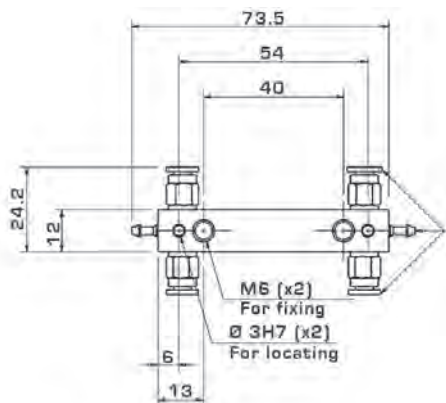




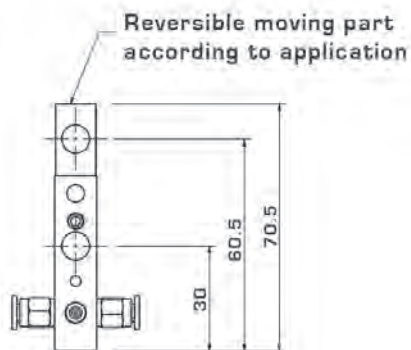
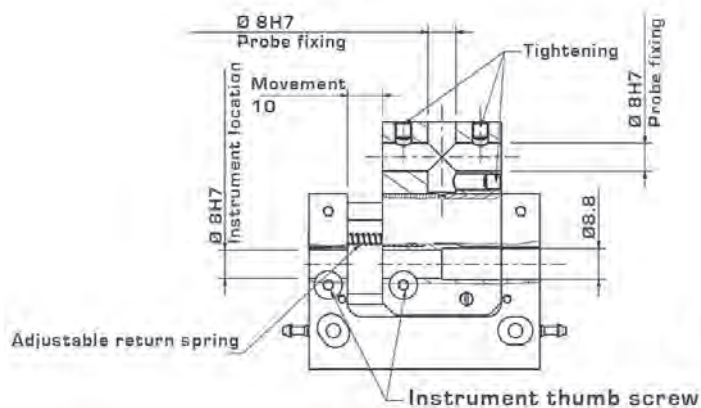
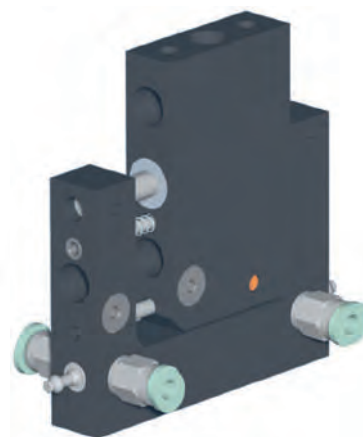
Multi-Point Measuring Systems

• Measurement module

Reference	Type
PMS1500	BM10 – Measuring block internal / external

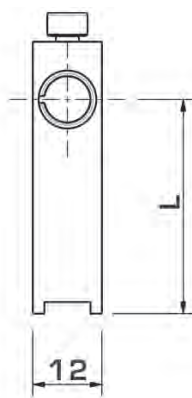
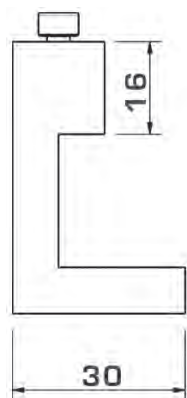


3 possibilities for supplying air to the jack (pipe Ø2.5 x Ø4)
Supply to be less than 4 bar



97

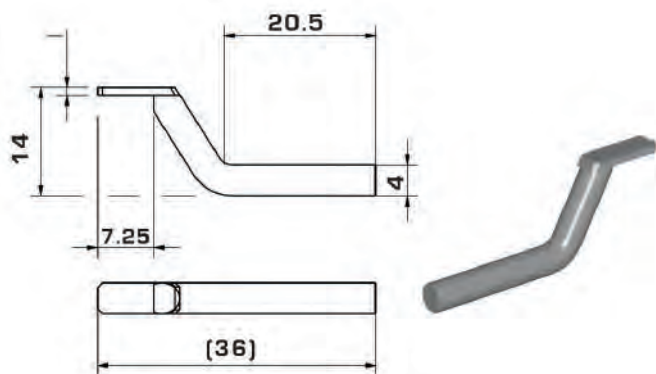
• Probe holders



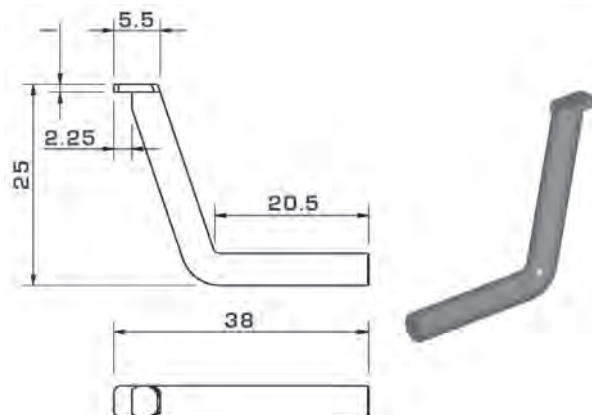
Reference	Type
PMS1510	Probe holders L 37 mm
PMS1511	Probe holders L 57 mm
PMS1512	Probe holders L 77 mm

Material :

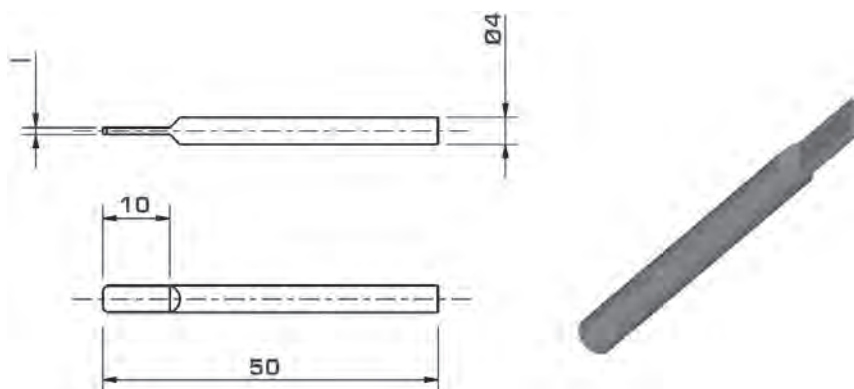
The contact heads are made from Carbide.



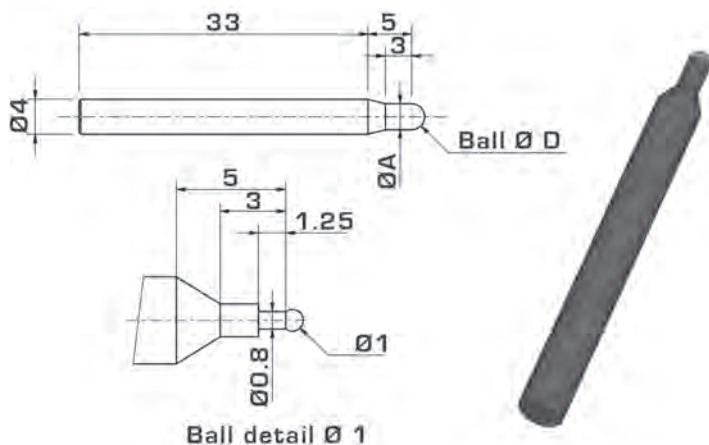
Reference	Type
PMS1600	Probe Ø 4 knife type with 13mm off-set, thickness 1



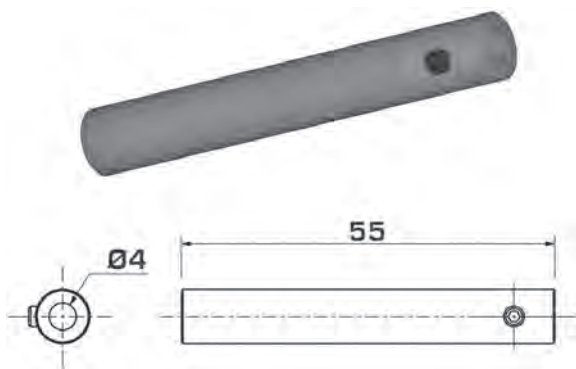
Reference	Type
PMS1601	Probe Ø 4 knife type with 24mm off-set, thickness 1



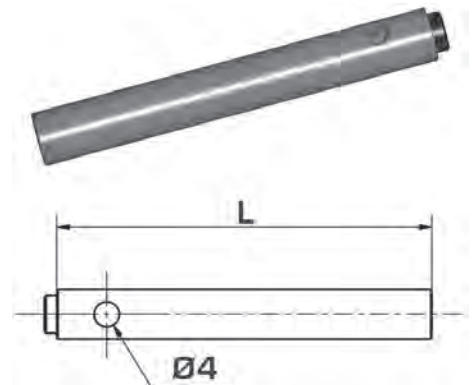
Reference	Type
PMS1602	Probe Ø 4 knife type, thickness 1



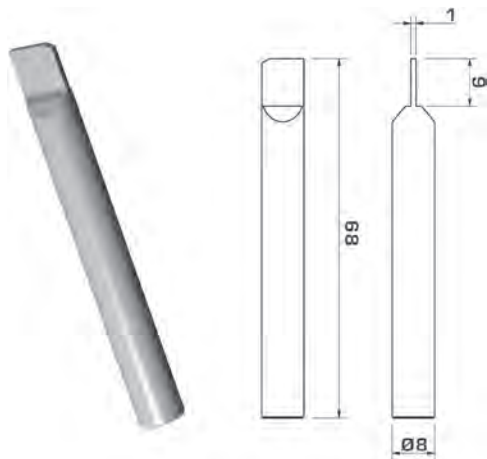
Reference	Type
PMS1610	Probe Ø 4 ball Ø 1
PMS1611	Probe Ø 4 ball Ø 1,5
PMS1612	Probe Ø 4 ball Ø 2
PMS1613	Probe Ø 4 ball Ø 2,5
PMS1614	Probe Ø 4 ball Ø 3
PMS1615	Probe Ø 4 ball Ø 4
PMS1616	Probe Ø 4 ball Ø 5



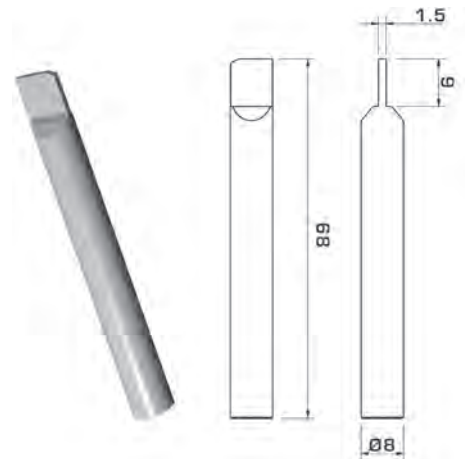
Reference	Type
PMS1680	Axial probe support L 55 (Ø 4)



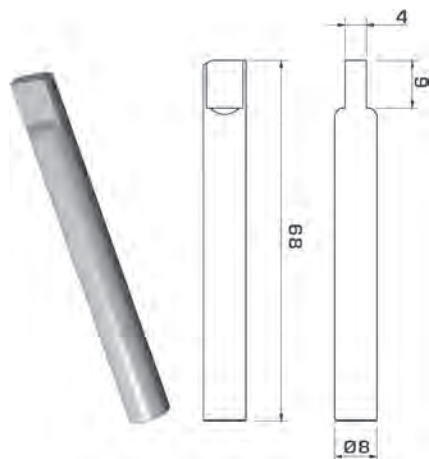
Reference	Type
PMS1681	Radial probe support L 60 (Ø 4)
PMS1682	Radial probe support L 90 (Ø 4)



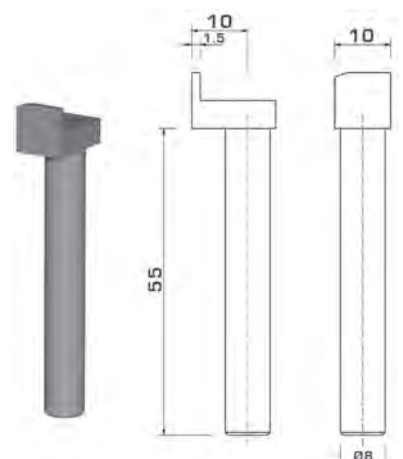
Reference	Type
PMS1620	Probe Ø 8 knife type, thickness 1



Reference	Type
PMS1621	Probe Ø 8 knife type, thickness 1,5



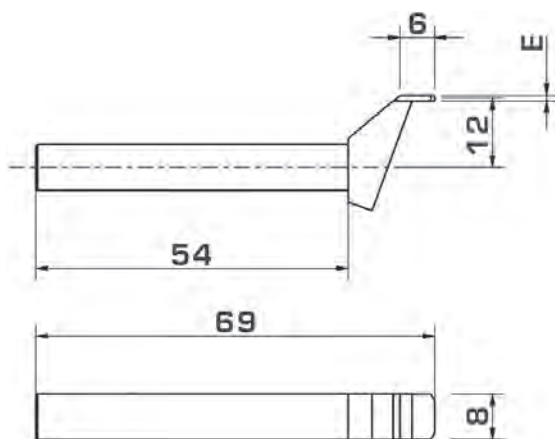
Reference	Type
PMS1622	Probe Ø 8 knife type, thickness 4



Reference	Type
PMS1623	Probe Ø 8 knife type with 10mm off-set, thickness 1,5

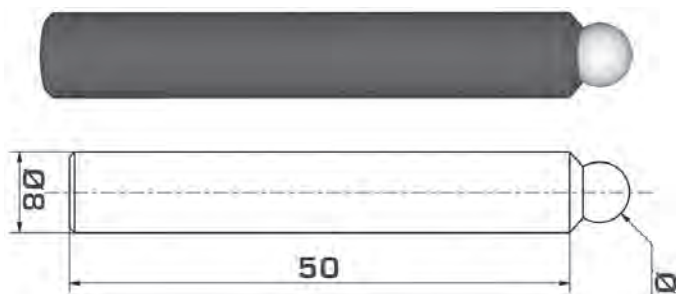
Material :

The contact heads are made from carbide.

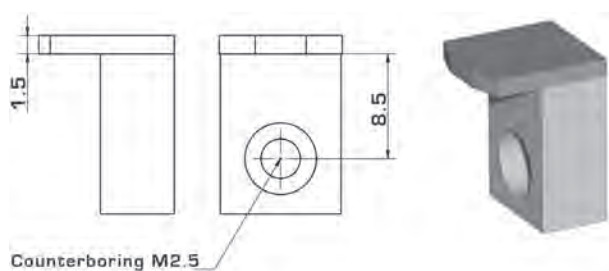


Reference	Type
PMS1624	Probe Ø 8 knife type with 13mm off-set, thickness 1
PMS1625	Probe Ø 8 knife type with 13mm off-set, thickness 1.5
PMS1626	Probe Ø 8 knife type with 13mm off-set, thickness 2

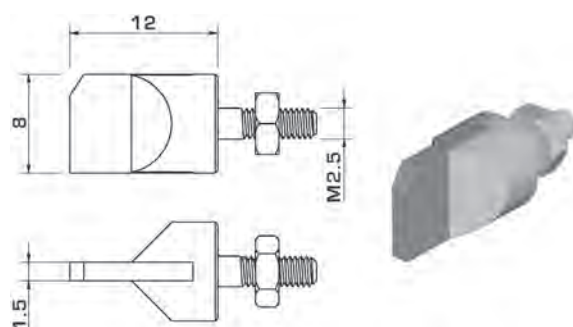
100



Reference	Type
PMS1630	Probe Ø 8 ball Ø 6
PMS1631	Probe Ø 8 ball Ø 7
PMS1632	Probe Ø 8 ball Ø 8
PMS1633	Probe Ø 8 ball Ø 9
PMS1634	Probe Ø 8 ball Ø 10
PMS1635	Probe Ø 8 ball Ø 11
PMS1636	Probe Ø 8 ball Ø 12
PMS1637	Probe Ø 8 ball Ø 13
PMS1638	Probe Ø 8 ball Ø 14
PMS1639	Probe Ø 8 ball Ø 15

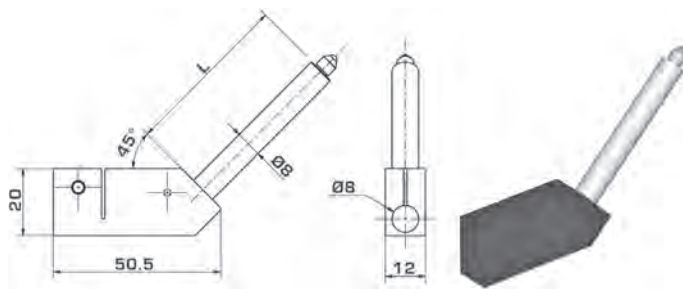


Reference	Type
PMS1650	Off-set knife probe

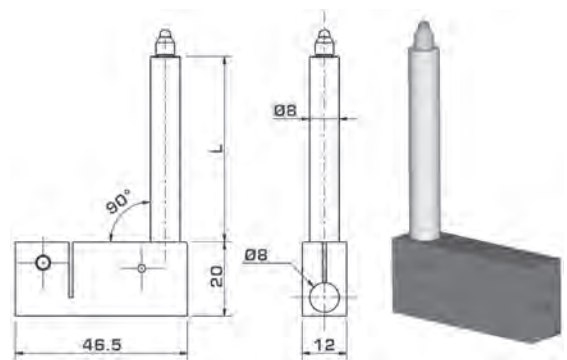


Reference	Type
PMS1651	Knife probe

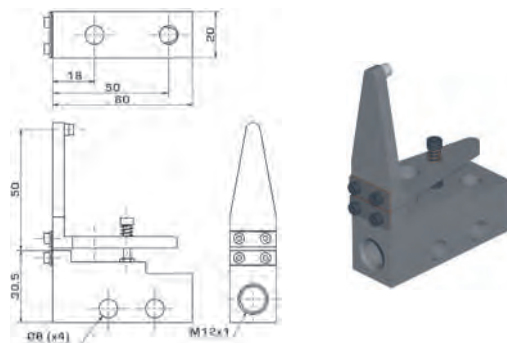
• Inserts / Extensions



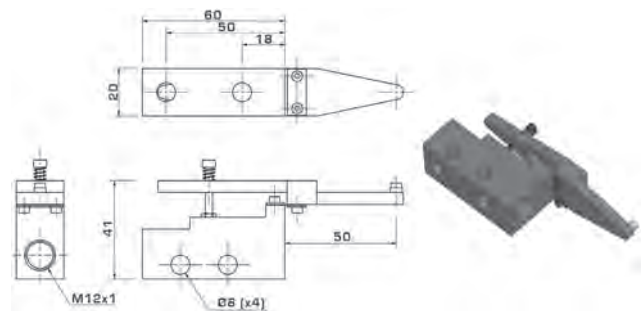
Reference	Type
PMS1700	Insert at 45° angle with movement 2,5 L 50
PMS1701	Insert at 45° angle with movement 2,5 L 25
PMS1702	Insert at 45° angle with movement 2,5 L 75



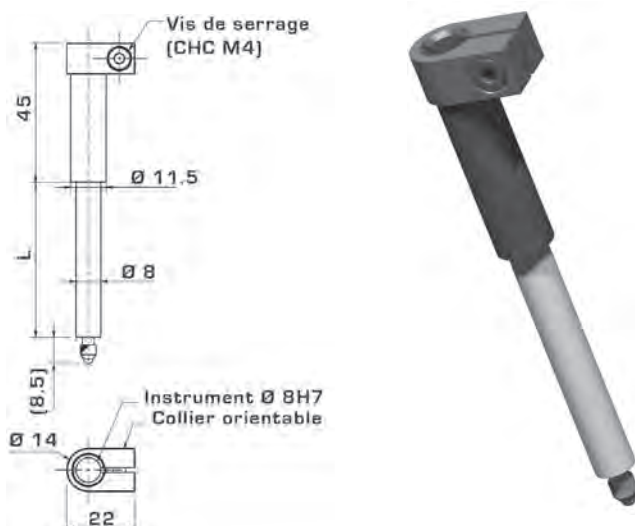
Reference	Type
PMS1705	Insert at 90° angle with movement 2,5 L 50
PMS1706	Insert at 90° angle with movement 2,5 L 25
PMS1707	Insert at 90° angle with movement 2,5 L 75



Reference	Type
PMS1710	90° Rocking insert



Reference	Type
PMS1711	180° Rocking insert



Reference	Type
PMS1720	Extensions movement 2,5 L 25
PMS1721	Extensions movement 2,5 L 50
PMS1722	Extensions movement 2,5 L 75



Measurement Heads for Comparators, Probes...

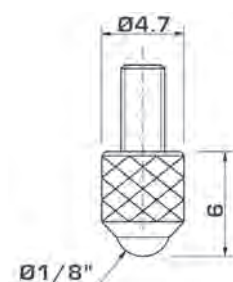
Application

Allows for the control of special forms or areas that are difficult to access when using a comparator or a sensor, as standard with a M2.5 threaded connection.

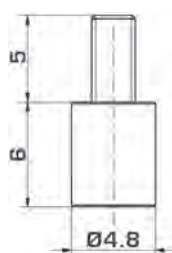
Features

Unit: mm

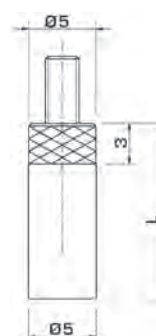
All the heads are made from hardened steel and ground on the measurement contact area (unless otherwise specified: e.g. Carbide, Ceramic, Ruby...). **Steel = hardened steel.**



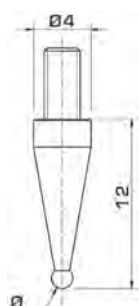
Reference
4TCM270
Steel
Carbide (H)
Ruby (R)
Sapphire (S)
Ceramic (C)
Delrin (KU)



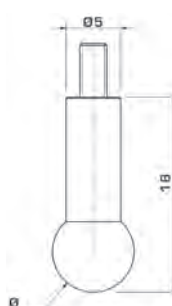
Reference
4TC57310
Steel
Carbide (H)



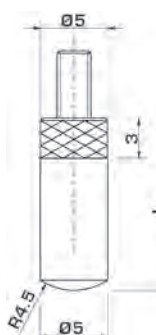
Reference
4TC57329-L
Steel
3
5 (standard)
8
10
12
15
20



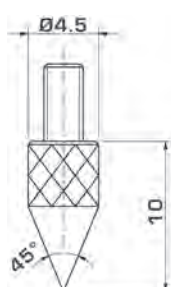
Reference
4TC57318-Ø
Steel
Carbide (H)
1 – 1,5
2 – 2,5
3 – 3,5
4 – 4,5
5 – 5,5
6 – 6,5



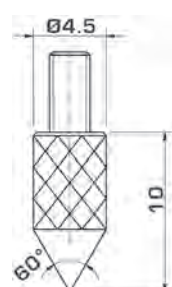
Reference
4TC57319-Ø
Steel
7
8
9
10
11
12



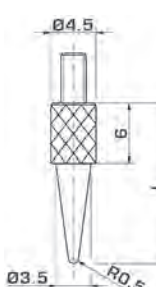
Reference
4TC57330-L
Steel
3
5 (standard)
8
10
12
15
20



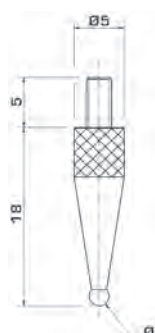
Reference
4TC57313
Steel
Carbide (H)



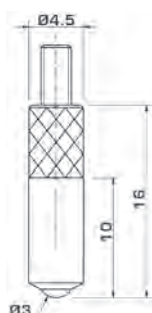
Reference
4TC5731360
Steel



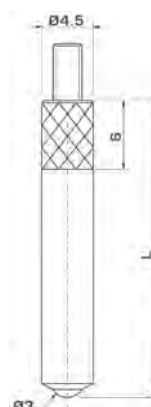
Reference
4TC57315-L
Steel
5
10
15
16 (standard)
20
30



Reference
4TC57342-Ø
Ruby (R)
1
2
3
4



Reference
4TC57316
Steel
Carbide (H)
Ruby (R)
Sapphire (S)

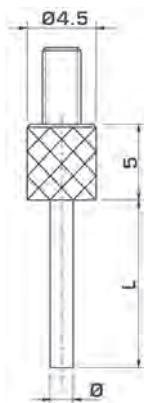


Reference
4TC57317-L
Steel
10
20 (standard)
30
40
50
60
70
80
90



Measurement Heads for Comparators, Probes...

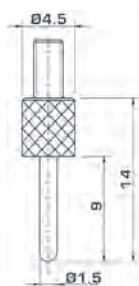
Reference	
4TC57314L-Ø	
Steel	
L	Ø
10	0,5
15	1
20	1,5
25	2
30	2,5
(35)	3
40	4
Longer or different Ø (ex : L10 – Ø 3 mm)	



Reference	
4TC57314L-Ø-H	
Carbide	
L	Ø
10	0,5 - 1,00
15	1,50
20	1,0 - 1,5
25	1,50 - 2,00
30	1,50 - 2,00
40	3,00

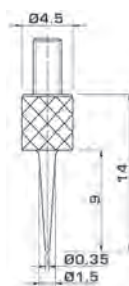
Other Ø or lengths
can be made

Other Ø or lengths
by request



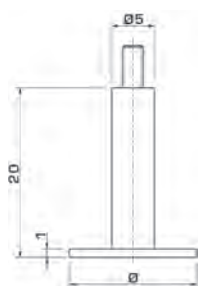
Reference
4TC57314R
Steel

Radius



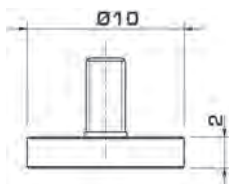
Reference
4TC57314P
Steel

Pointed

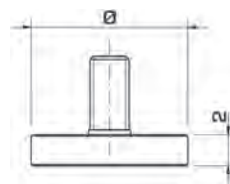


Reference
4TC57350-Ø
Steel
6
8
10
12
15 (standard)

(Former Ref. P19A)



Reference
4TC57311
Steel
Carbide (H)
Ceramic (C)

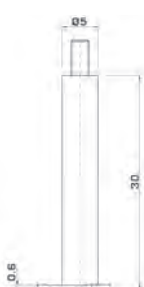


Reference
4TC57311-Ø
Steel
8
11 - 19 (in 1's)
20
25
30
35

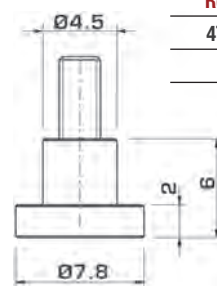


Reference
4TC57355-E
Steel
0,5
1
Delivered with a nut for orientation

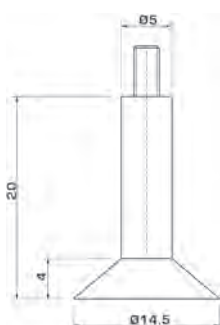
(Former Ref. ETG)



Reference
4TC57355-3
Steel
Delivered with a nut for orientation

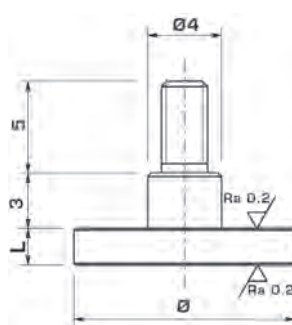


Reference
4TC57322
Steel



Reference
4TC57351
Steel

(Ref. P13A)

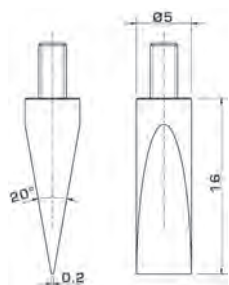


Reference	
4TC573400-L	
Steel	
Ø	L
7,8	1 – 1,5 – 2
10	1 – 1,5 – 2
15	1,5 – 2
20	1,5 – 2

L (thickness) a choice for
each Ø



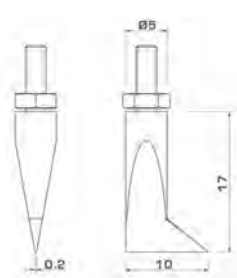
Measurement Heads for Comparators, Probes...



Reference

4TC57320

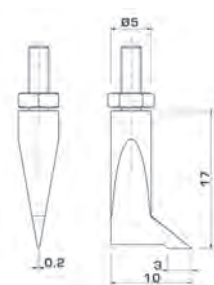
Steel
Carbide (H)



Reference

4TC57358-S

Steel
Delivered with a nut for orientation

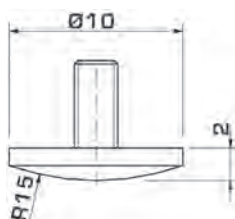


Reference

4TC57358-D

Steel
Delivered with a nut for orientation

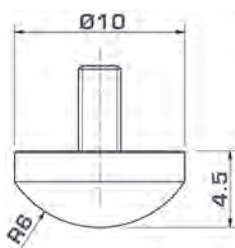
Former Ref. SCGM



Reference

4TC57312

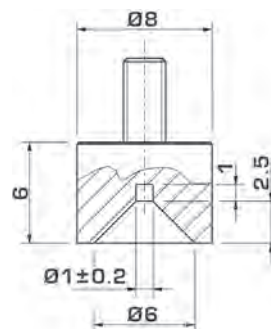
Steel
Carbide (H)
Ceramic (C)



Reference

4TC57332

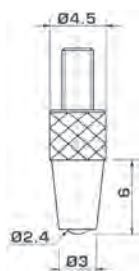
Steel



Reference

4TC57326

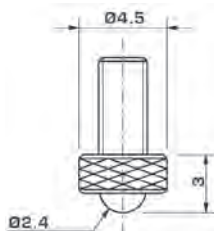
Steel



Reference

4TC57321

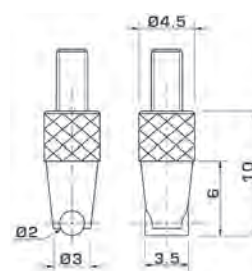
Steel
Carbide (H)



Reference

4TC57323

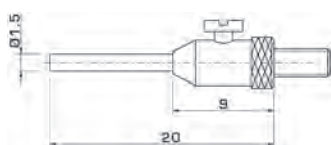
Steel
Carbide (H)



Reference

4TC57324

Steel
Carbide (H)
Delivered with a nut for orientation

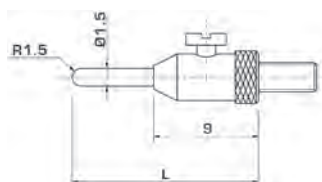


Reference

4TC57360

Carbide (H)

Inter-changeable probe
(Former Ref. NC4-2106W)
Other lengths and forms on request

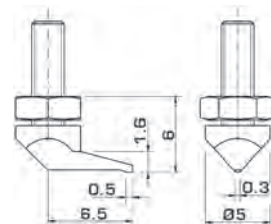


Reference

4TC57361

Steel

4 Inter-changeable probes
L : 16/26/36/46 mm
(Former Ref. TN12)



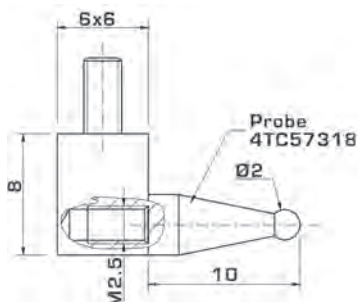
Reference

4TC57339

Steel

Delivered with a nut for orientation

(Former Ref. TN20)

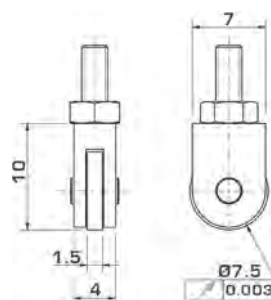


Reference

4TC57327

Steel

Tapping M2.5
+M1.6 Transverse

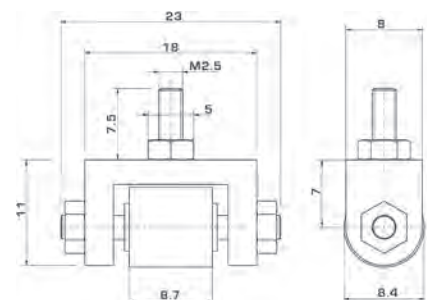


Reference

4TC57328

Steel

Delivered with a nut for orientation



Reference

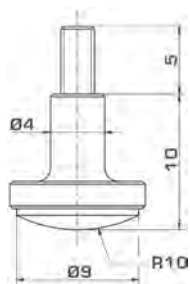
4TC57325

Steel

Delivered with a nut for orientation



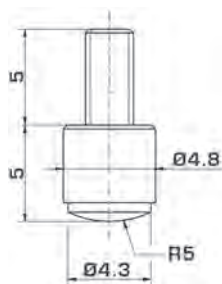
Measurement Heads for Comparators, Probes...



Reference

4TC5731210

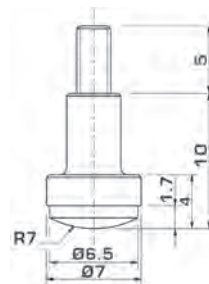
Carbide



Reference

4TC57331

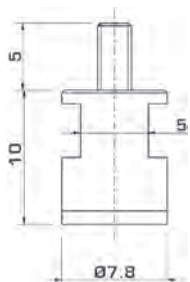
Carbide



Reference

4TC573108

Carbide



Reference

4TC57335

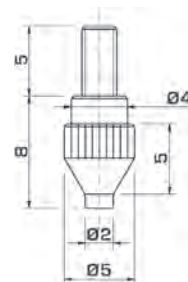
Carbide



Reference

4TC573102

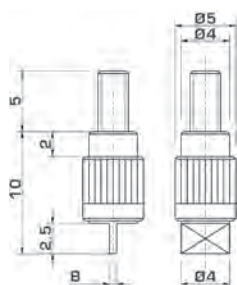
Carbide



Reference

4TC573105

Carbide



Reference

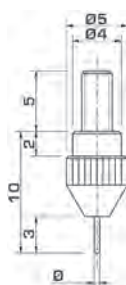
4TC573110-B

Carbide

0.40

0.60

1.00



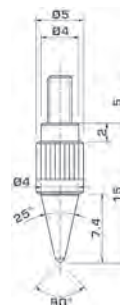
Reference

4TC573112-Ø

Carbide

0.45

1.00

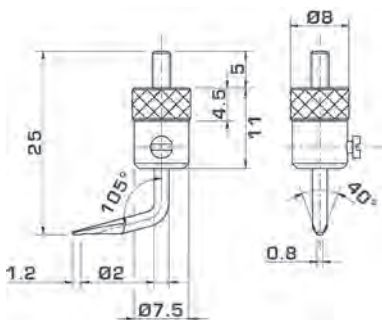


Reference

4TC573114

Carbide

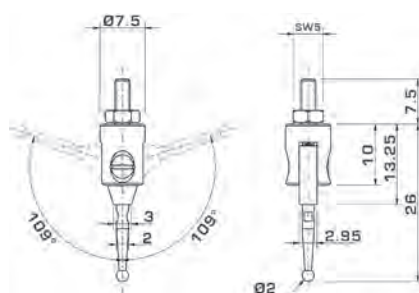
105



Reference

4TC57334

Steel

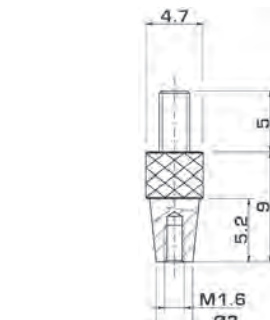


Reference

4TC57333

Carbide

Heads interchangeable with M1.6 heads (indicator with lever). Delivered with a nut for orientation



Reference

4TCRM1.6

Steel

Allows you to mount the indicator probes M1.6



Reference

4TCR L -4

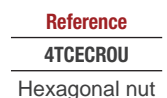
10	50
15	60
20	70
25	80
30	90
40	100



Reference

4TCR L -5

6	30
10	35
15	40
20	50
25	60



Reference

4TCECROU

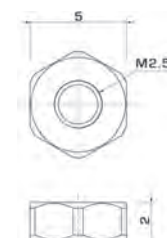
Hexagonal nut



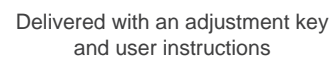
Reference

4TCECROUM

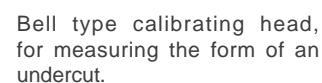
Knurled nut



Allows you to mount the indicator head and lever



Case of 9 probes + 1 extension



• Comparator table supports

Table supports for comparators.

Hardened steel ($R_a < 0.4 \mu\text{m}$) or black granite Class 0 (DIN 876).

Chrome plated steel column $\varnothing 25$, length 250 or 350 mm (according to type).

Standard arm distance between centres is 65, 100 mm or with adjustable end 79 mm.

Reference	Type	Material	Dimensions mm	Column mm	Arm
PMS3100S	Table + column + arm	Granite	200x150x40	L 250	E 65 mm
PMS3100RF	Table + column + arm adj			L 250	Adjustable end
PMS3100C	Table + column			L 250	-
PMS3100	Table only			-	-
PMS3102S	Table + column + arm	Granite	300x200x50	L 350	E 100 mm
PMS3102RF	Table + column + arm adj			L 350	Adjustable end
PMS3102C	Table + column			L 350	-
PMS3102	Table only			-	-
PMS3110S	Table + column + arm	Steel	120x150	L 250	E 65 mm
PMS3110RF	Table + column + arm adj			L 250	Adjustable end
PMS3110C	Table + column			L 250	-
PMS3110	Table only			-	-

Other dimensions on request.



• Tables with holes

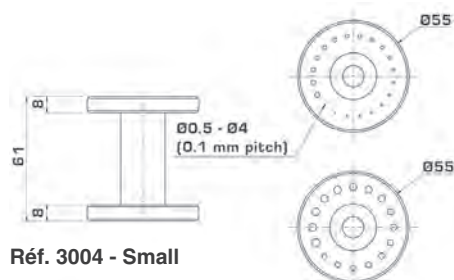
Tables with holes are ground on 4 faces.

Hardened steel.

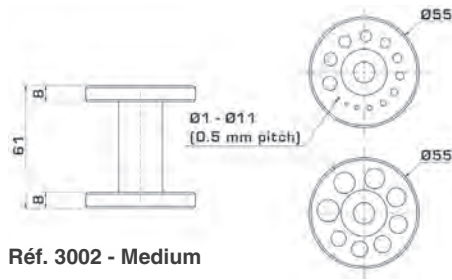
Allows the measurement of height on parts with flanges or shoulders.

Used in conjunction with a table, column and a comparator.

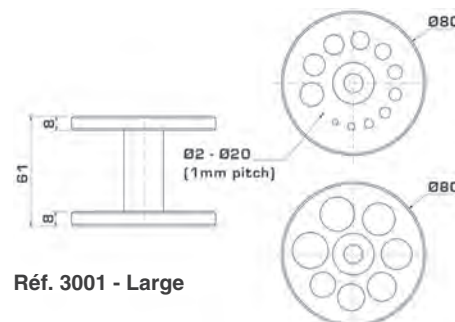
Reference	Type	Holes mm	NoGo mm
PMS3001	Table with holes – large	$\varnothing 2$ to 20	1
PMS3002	Table with holes – medium	$\varnothing 1$ to 11	0.5
PMS3004	Table with holes – small	$\varnothing 0.5$ to 4	0.1



Réf. 3004 - Small



Réf. 3002 - Medium



Réf. 3001 - Large

• Depth Measuring Bridge

Foot in chromium plated steel material.

Model with flat foot for measurement of depths.

Model with "V" foot for measurement of circularity, depth of the slots on the cylindrical parts...

Référence	Type	Length mm	Width mm
PMS3201	Flat	50	16
PMS3202	Flat	80	16
PMS3203	Flat	100	16
PMS3204	Flat	120	20
PMS3205	Flat	150	20
PMS3210	"V" at 120°	Ø 10 at 100	16

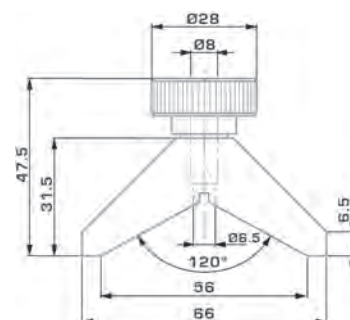
Knurled nut sold separately.



Ref. PMS320X



Ref. PMS3210



• Vices for measurement and support

Measurement vice, V-shaped groove in the fixed jaw.

Interchangeable jaws.

Parallelism of the jaws 0.01mm.

Delivered with 1 set of steel jaws and 1 set of plastic jaws.

Can be used as directional support with accessories.

Reference	Type	L x W x H mm	Open Size mm	Height mm
PMS4001	Small vice	50 x 15 x 15	14	6
PMS4002	Medium vice	75 x 25 x 25	24	10
PMS4003	Large vice	100 x 35 x 35	34	14
PMS4011	Directional support for PMS4001			
PMS4012	Directional support for PMS4002			
PMS4013	Directional support for PMS4003			



• "V" (magnetic, with clamp, directional)

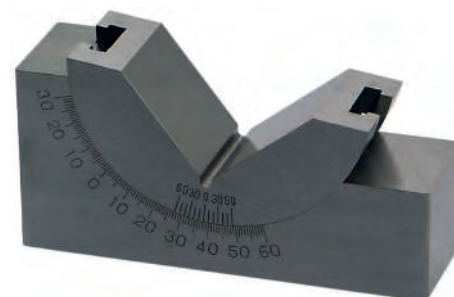
Directional "V"

"V" adjusts by 90° -30°/+60°, ground ends.

Hardened steel.

Delivered in a wooden box.

Reference	Type	L x W x H mm	Ø allowed mm
PMS4121	Directional "V"	75 x 25 x 33	28 maximum
PMS4122	Directional "V"	102 x 30 x 46	40 maximum
PMS4123	Directional "V"	102 x 46 x 46	40 maximum



• “V”s (magnetic, with clamp, directional)

Magnetic “V”s

Mini “V” has a single “V” with a ground finish.

Unswitchable magnet force.

“V” has two “V”s, with a ground finish.

Hardened steel.

Delivered in a wooden box.

Delivered as individuals or as a pair upon request.

Higher precision is available upon request.



Ref. 4105 - Mini

Reference	Type	L x W x H mm	Ø accepted mm	Force N	Precision mm
PMS4105	Mini “V” Magnetic	20 x 20 x 17.5	2 - 18		0.01
PMS4100	“V” Magnetic	70 x 45 x 70	2 - 40	600	0.004
PMS4101	“V” Magnetic	80 x 67 x 96	6 - 66	900	0.004
PMS4102	“V” Magnetic	100 x 70 x 96	6 - 70	1200	0.004

Also available in non hardened steel.



Ref. 4100 à 4102

“V” with clamp

“V”s have 2 different sized “V”s at 90°, with a ground finish and a clamp.

Hardened steel.

Delivered as individuals or as a pair upon request.

Delivered in a wooden box.

Available in stainless steel with a precision of 0.004mm.

Available in hardened steel with a precision of 0.002mm.

Version available with embedded clamp.



Ref. 4150



Ref. 4151 à 4153

Reference	Type	L x W x H mm	Ø accepted mm	Precision mm
PMS4150	“V” with clamp	25 x 20 x 20	0.2 – 18	0.004
PMS4151	“V” with clamp	50 x 40 x 40	5 – 30	0.004
PMS4152	“V” with clamp	75 x 55 x 55	5 – 50	0.004
PMS4153	“V” with clamp	100 x 75 x 75	7 – 70	0.004

Also available in stainless steel, hardened steel to 0.002mm, with embedded clamp...



Model with embedded clamp

Precision “V”

“V” has a single 90° “V” with a ground finish.

Hardened steel with a geometric precision of 0.004mm.

Delivered as individuals or as a pair upon request.

Also available in non hardened steel.

Reference	Type	L x W x H mm	Ø accepted mm	Precision mm
PMS4180	Precision “V”	75 x 35 x 30	5 – 40	0.004
PMS4181	Precision “V”	100 x 47 x 40	5 – 55	0.004
PMS4182	Precision “V”	150 x 55 x 45	5 – 60	0.004
PMS4183	Precision “V”	200 x 65 x 55	5 – 75	0.004
PMS4184	Precision “V”	250 x 85 x 70	5 – 100	0.004

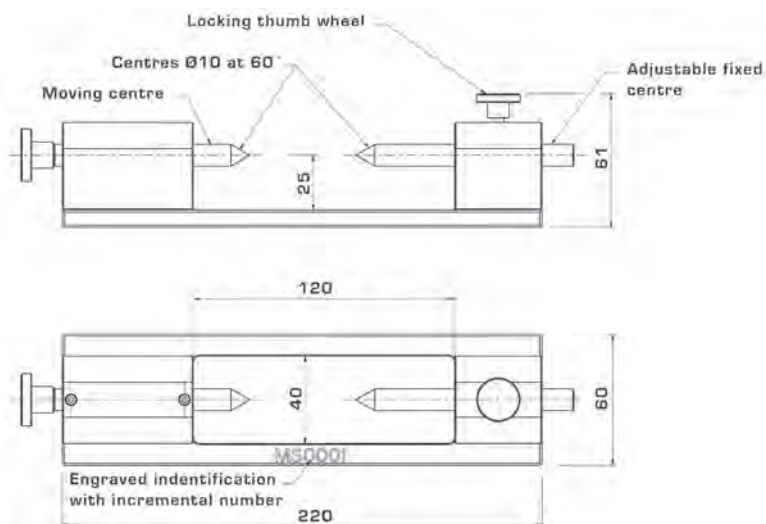
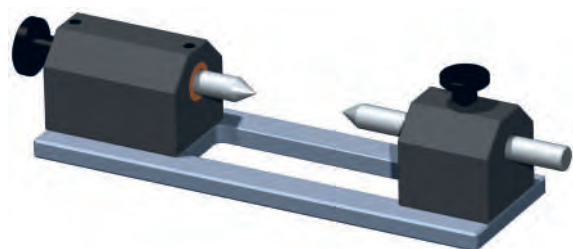


• Between centres

For system using a projector, video camera,
Measurement device or visual check...
Comprising of 1 fixed centre and 1 revolving moveable centre.
Support made from burnished steel.
Base plate and centres are both from hardened steel and ground.

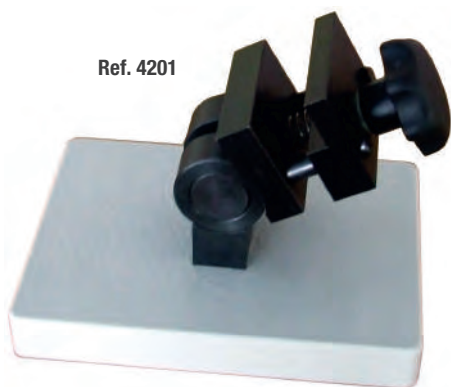
Reference	Max opening	H Centres	Centres
	mm	mm	mm
PMS4050	100	25	Ø 10

Other models on request



• Micrometer supports

Ref. 4201



Ref. 4202



Reference	Type	Opening grips
		mm
PMS4201	Directional Support	15.5
PMS4202	Low price directional Support	15



Bespoke parts

In our precision machining workshop,
we produce all types of special parts according to our customers requirements...

Machines / manufacturing processes

- Turning, milling,
- Grinding, flat and cylindrical, internal and external,
- Spark Erosion: wire and form,
- Flat and cylindrical, interior and external honing.

Special techniques / know how

- Brazing steel/carbide, brazing of miniature parts (balls, bars).
- Manufacture of punches without fastener (extrusion without repair).

We carry a large stock of blanks and standard elements allowing a fast reaction to your demands:

Plain plug gauge blanks, jaw blanks, steel and carbide balls,
carbide bars, smooth ring blanks, gauge handles.



• Gauges

To medical or customer standards, manufactured to your design.

We are able to supply all parts: micrometer, binocular, thread gauges, Torx ® gauges, hexagonal plug gauges...

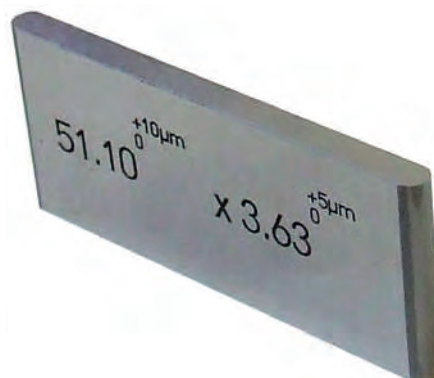
• Special gauges

For concentricity, squarness, to your design or application...

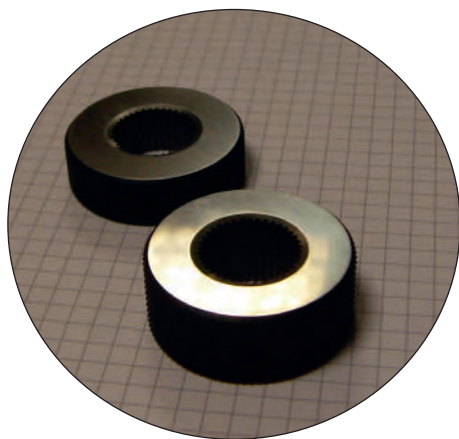
111



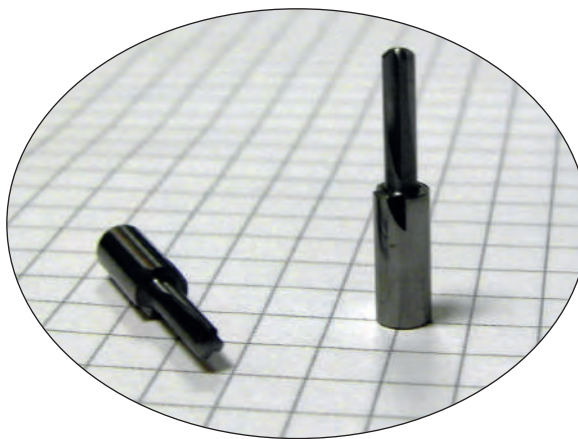
Gauge to control length and thickness, blank made by electro-erosion and finished by honing.



Checking fixture for the control of a cruciform size 2 conforming to NF EN ISO 4757 made by hard milling.



Set of plain rings gauges made by electro-erosion and honing.



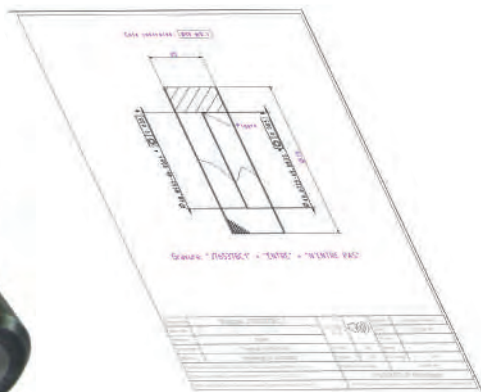
Gauge of the control of a cruciform according to customer drawing or specification, made from carbide by grinding an extrusion.



• Master Gauges



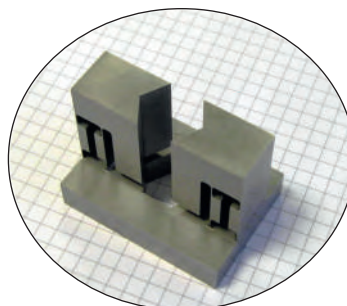
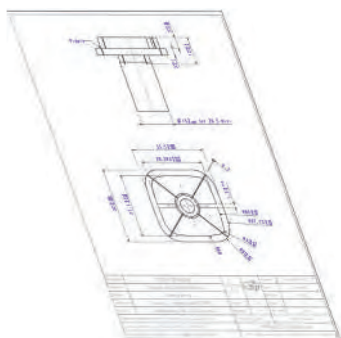
Master gauge for machine of sorting.



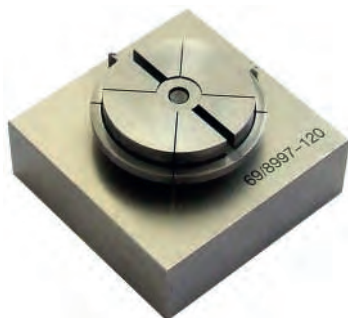
Gauge and Master gauge for measuring fixture

• Gauges, Fittings

112



Flexible plate fitting for measurement on hexagonal profiles.



Fittings base with expandable grip for the control of watch parts.



Fittings to position and fix allowing for fast control of a series of 3D parts.



Bespoke parts

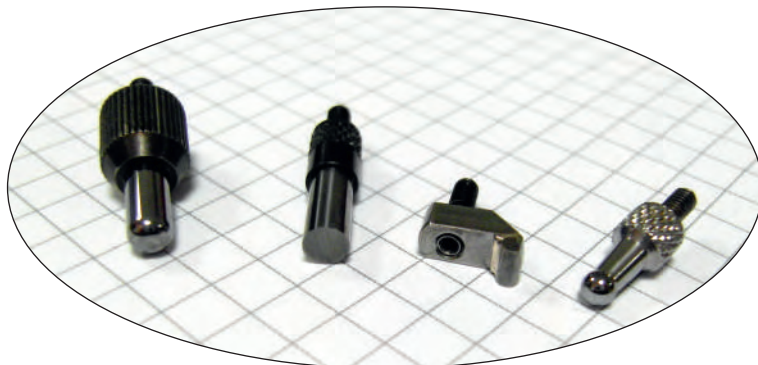
• Comparator Heads / Heads for measurement tables

Sharp angle heads of both internal and external (bell heads):) : measure of gauge plain.

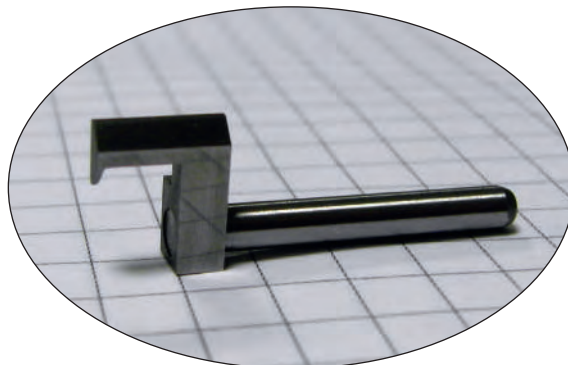
Ball heads at standard or special Ø's.

Balls in steel, carbide, ruby, Nylon, etc

Heads according to your drawings in steel, carbide, diamond, ceramic.



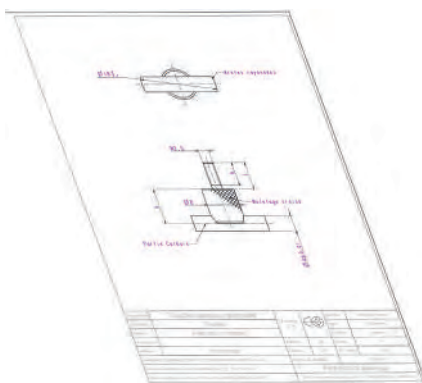
Heads with carbide elements (bar, ball) assembled by connection or brazing.



Minutaire crossed carbide heads for the control of the diameter of an internal undercut on a measurement table.



Carbide ball head for the control of teeth on a measurement table.



Conical carbide heads for the control of distance between centres on a measurement table.

113

• Modification/Adaptation of equipment

We modify and adapt equipment according to your needs :

- Special nozzles on slide calipers,
- Special heel on depth gauge,
- Micrometer with special heads, fine, stepped...
- Measuring head of type Diatest, Osimes for undercuts, modified,
- Special Gauge as a base for smooth gauges, threads...



Modification to the diameter of the heads on micrometer.



Additional cylindrical stop for the control of depth of a position in a bore.



Design and manufacture

GAUGE PRO is your manufacturer for solutions of component control, from the simplest.... to the most complex.

We invite you and let us bring solutions adapted to your needs.

From initial study or brief to final manufacture and commissioning, we will control all the stages for the installation of your control assembly.

Our experience

Advising in the field of metrology and dimensional checking.

To study and design on CAD software.

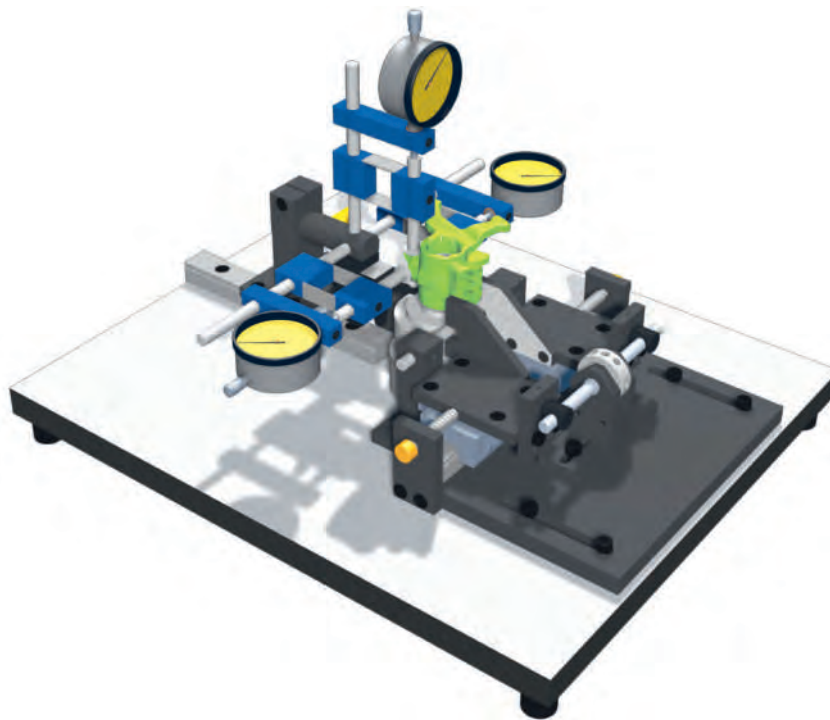
Manufactured to your timescales and conditions along a written customer / supplier collaboration.

Assembly, mounting, adjustments, developed and tested.

Validation on arrival to ensure it fulfils your criteria or tests (capabilities, R& R, etc.).

Made with ease of use and maintenance in mind.

Supplied, if required, with technical documentation (notes, copies of drawings, wiring diagrams, etc.)...



The technologies used

Automatic measurement cycles, semi-automatic, manual : from a attribute gauge to a fully automated special machine.

Measuring with and without contact: mechanical, optical, pneumatically : to answer all the different requirements or constraints : brittleness of the parts, utmost precision, fast cycle times, complexity of the geometries...

Measurement - dimensional, geometrical, force, torque, surface finish : globalised under your control to offer one "turn-key" solution to you whatever the physical sizes to be controlled, singularly or in combination...

Automation : we offer you the solutions that meet all your demands in terms of controlling and interfacing with the equipment.

Management of the output data from the measurement equipment : to allow the total integration of control in your manufacturing process or your production line.

Acquisition of measurements by sensor (inductive, incremental...), traditional instruments, camera : the control of the processes and the means guaranteeing a productive answer to your problems in terms of cost ratio / performance.

Data Processing, controller, display, comparator : to simplify as much as possible the processing of measurements without neglecting the production / drawing constraints, records or legibility of measurements.





Information required for your enquiry

Description of the part to be measured

Dimensions to be controlled or constraints to be checked (drawing and descriptive information) :

Type of dimension (length, diameter, height...), + associated tolerance :

Is the measurement static or dynamic :

Part material (+ possible treatments) :

Surface finish (rough, machined, ground) :

Description of desired measurement

The measurement goal (control of 100% of the parts, for adjustment machine, sampling...) :

To specify the desired productivity (frequency) :

Type of measurement desired (automatic, manual) :

The environment (workshop, metrology laboratory or on a production line...) :

Treatment of resulting measurement (good-bad part, displaying values...) :

Displaying the measurement (measuring instrument, read-out, PC) :

Management of the measurements (SPC, production follow-up...) :

Other important information :

Comments :

Your details

Compagny stamp

Company

Name and Position

Tel.

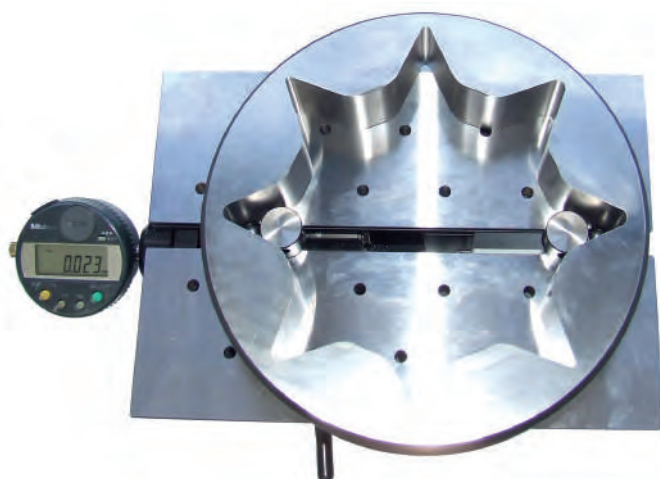
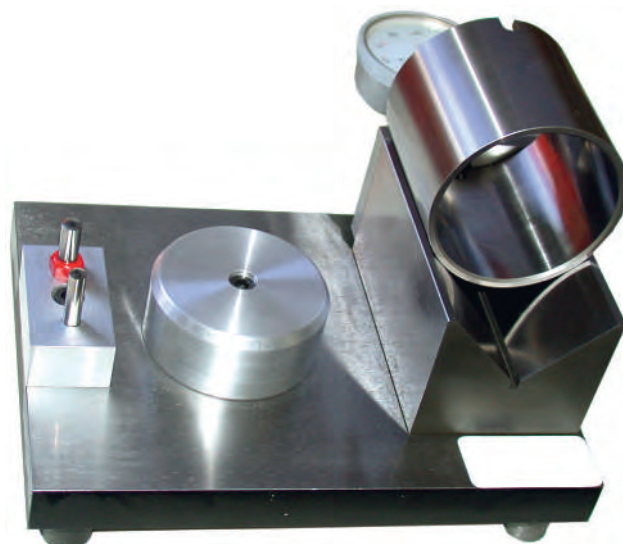
Fax

E-mail



- Simple assemblies / control tables

Controlling the depth of a notch (measurement)
and its width (attributes)



Controlling of teeth for dimension by a
ball using a measurement table adapted
with special jaws

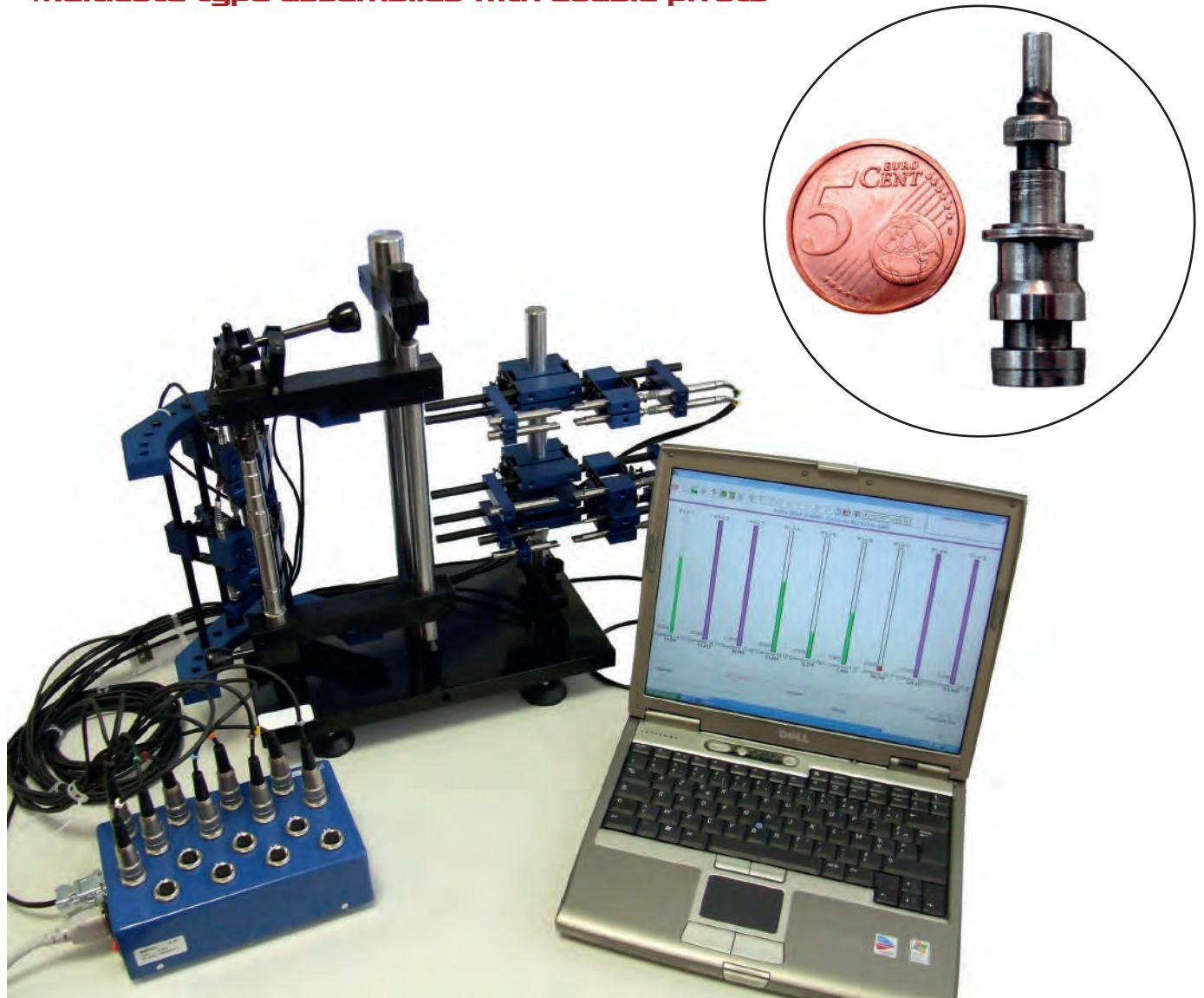
Output of conductivity from the control
of a membrane at high temperature



Measurement table for checking the distance between
centres with retractable conical carbide jaws



• Multicote type assemblies with double pivots



Multicote type assembly with base and standard modular elements :

For the control of turned parts, two at a time: controlling diameters on the right-hand station and heights on the left-hand station.

Between two centres grip, probing with keys knives and carbide ball heads.

Acquisition and processing of the measurements is by inductive sensors, a multiplexer and acquisition software for processing Calimess measurements.

Ideally used at and by an operators station: simplicity, speed of control and high measuring accuracy.

Calibration functions are protected by a password, output is by bargraph with colors and a safeguard for the measurements.

Multicote Assemblies pivoting / general :

For the fast control of many characteristics simultaneously on parts of all dimensions, including very small parts (see photo).

Its use is possible with comparators, sensors + read-outs, etc....

A simple design ensures a high degree of accuracy, making it possible to use in the workshop or in a polluted industrial environment whilst not requiring any special maintenance.

Calibration with metrology gauge or master gauge.

All the modular elements are available individually to create your own control assembly, adaptable to your application (see from page 84)



• Automated assemblies

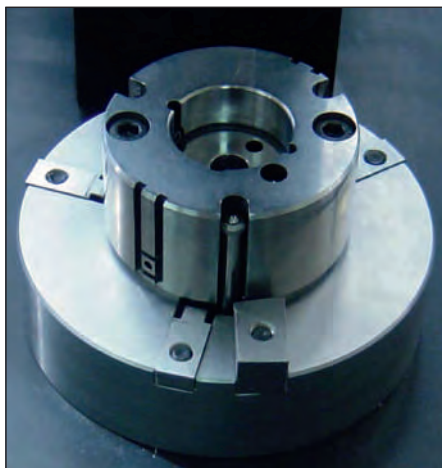
Automated control assembly mounted on a robotized production line.

Control of medium forging, secondary operation machining.
Control of 8 dimensions simultaneously and dynamically (dimension and defect of form).

Reduced cycle time (20 seconds approximately), used in a workshop environment.

Interfaces with inductive sensors, multiplexer and software.

Repeatability by part in automatic cycle: < 10 μm .



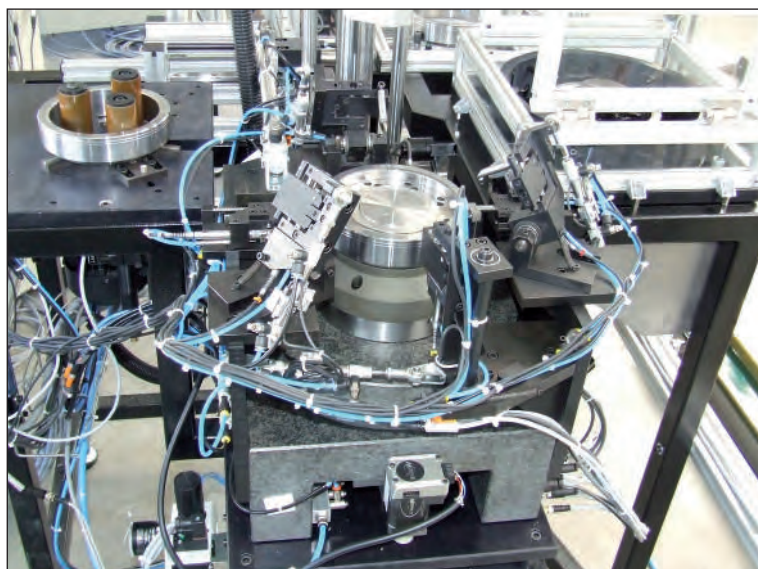
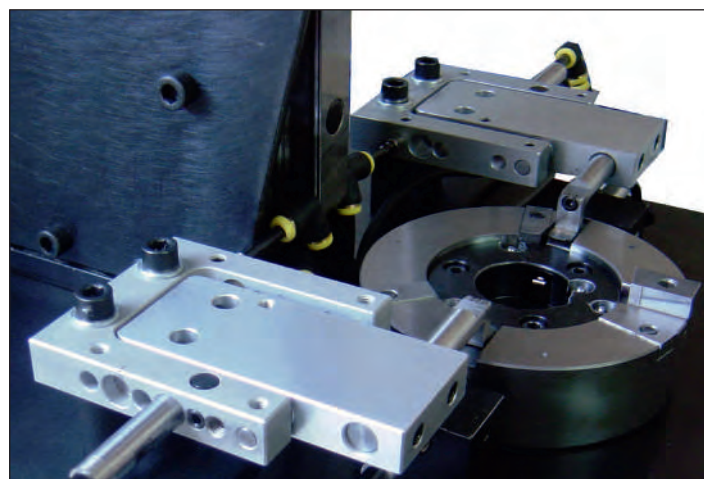
Semi-automated control assembly for the control of high precision technical plastic parts.

Injected plastic parts.

Restrictions on the deformation of the parts during fastening.

Combined measurements using contact and pneumatic systems.

Repeatability of 100 measurements of a master gauge: < 2 μm .



Autonomous control machine integrated into a production line at the exit of machine.

Precision ring gauges of $\varnothing 130$, allows dimensional measurement and the defect of form, with tolerance 50 μm .

Loading by travolator, unloading via ejection chutes.

Five distinct stations: loading, blowing, dimensional measurement, control of material defects, unloading.

Displacement enters the stations via rotary manipulator.

Control of cracks by eddy current detection on internal and external surfaces.

Interface between operator and machine is via a touchscreen.

Data processing by read-out SPC400, dialogue with controller and safeguarding of the data.

Repeatability on parts in automatic cycle: between 3 and 7 μm according to the dimensions.

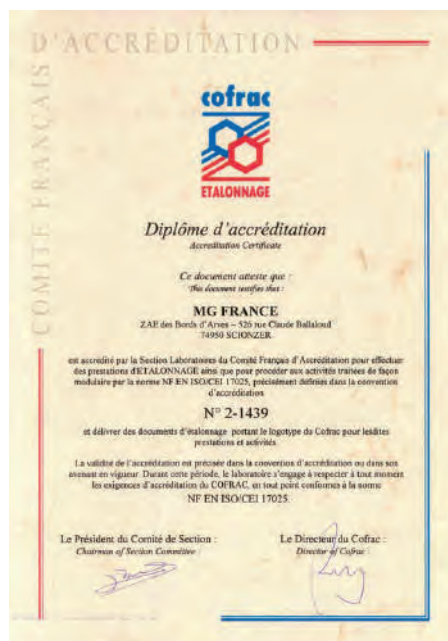


OUR METROLOGY LABORATORY

Gauge Pro has a **laboratory of metrology** (MG France) to realise the calibration, the control, the checking and the maintenance of the master, setting gauges and gauges for dimensional checks.

The environmental conditions within the laboratory are controlled by powerful air-conditioning systems ensuring a temperature of $20^{\circ} \pm 0,5^{\circ}$ and a humidity around 45%. This control of the surrounding conditions is essential to obtain reliable measurements and for the protection against corrosion of the materials, equipment and master gauges used for the control of our products.

Since October 2001, our laboratory (MG France) has been accredited by **COFRAC** under the reference **2-1439** (details of our accreditation available on request) and is proof of its competence with regard to gauge certification and dimensional control.



The activities of our laboratory cover the complete range from checking of new gauges to the service of calibrating “in-use” customer gauges.

With the supply of control gauges or in the calibration service, we can propose two types of certificate of calibration.

A COFRAC certificate of calibration

When we perform a “COFRAC” service of calibration, we will provide the following documents :

- **A CERTIFICATE OF CALIBRATION** : this document provides all the measurements and remarks necessary relating to the calibrated product, along with the conditions, means and methods used for the calibration. The document follows the recommendations of standard X 07-012.
- **A CHECKING REPORT** : this document provides all the measurements and remarks necessary relating to the calibrated product, along with the conditions, means and methods used for the calibration and the conformity compared to the standard specifications or those defined by the customer. This document follows the recommendations of standard X 07-011.

A “Manufacturer” certificate of calibration

These documents are condensed and simpler to read. They comprise the same measurements and remarks as the COFRAC certificate of calibration but in a simplified way.

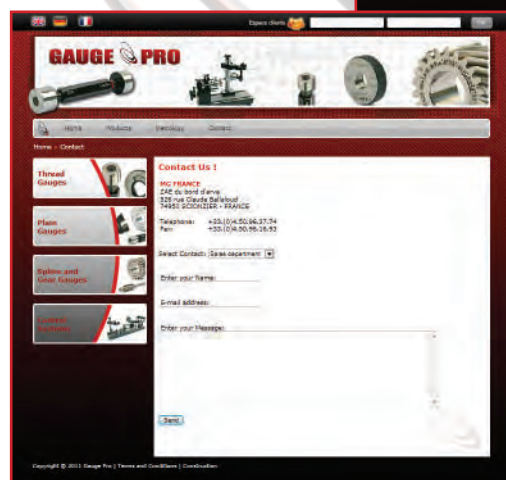
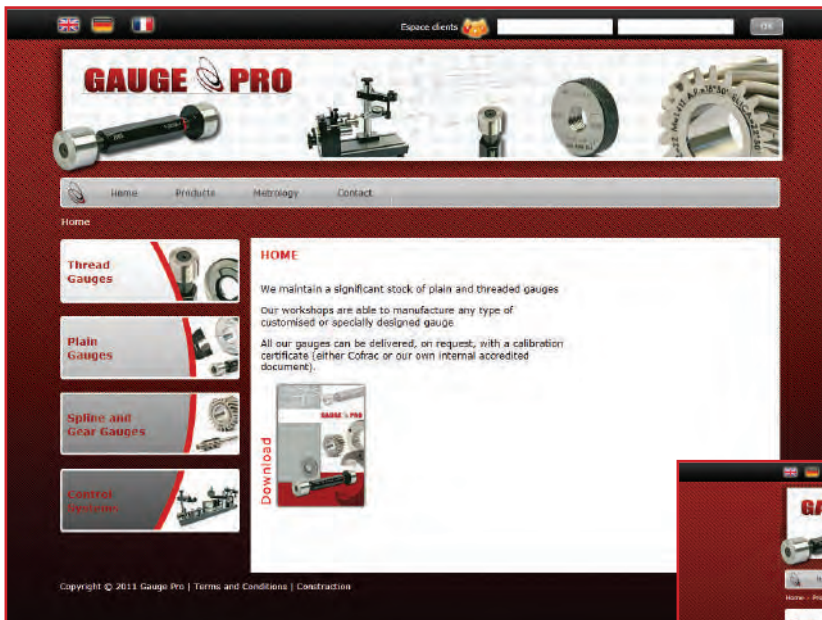
The methods of measurement as well as the methods of storage are different from **COFRAC certificate of calibration**.

Example of order

The certificate of calibration is not delivered automatically with the gauge, it is necessary to specify it at the time of your order.

COFRAC certificate of calibration : A COFRAC certificate of calibration with a report of calibration and a report of checking.

For further information, visit our website at
www.gauge-pro.com



- Find all our items online
- Login in and request a quotation
- Contact us : sales@gauge-pro.com

Table of Free Tolerances

• External Threads

With the top of	Up to and including	d					e					f					g					h							j				
		6	7	8	9	10	5	6	7	8	9	10	5	6	7	8	9	10	5	6	7	8	9	10	11	5	6	7	8				
3	es	-20	-20	-20	-20	-20	-14	-14	-14	-14	-14	-6	-6	-6	-6	-6	-6	-2	-2	-2	-2	-2	0	0	0	0	0	0	+2	+4	+6	+8	
	ei	-26	-30	-34	-45	-60	-18	-20	-24	-28	-39	-54	-10	-12	-16	-20	-31	-46	-6	-8	-12	-16	-27	-42	-4	-6	-2	-2	-4	-6			
3	es	-30	-30	-30	-30	-30	-20	-20	-20	-20	-20	-10	-10	-10	-10	-10	-10	-4	-4	-4	-4	-4	0	0	0	0	0	+3	+6	+8			
	ei	-38	-42	-48	-60	-78	-25	-28	-32	-38	-50	-68	-15	-18	-22	-28	-40	-58	-9	-12	-16	-22	-34	-52	-5	-8	-2	-2	-4	-6			
6	es	-40	-40	-40	-40	-40	-25	-25	-25	-25	-25	-13	-13	-13	-13	-13	-13	-5	-5	-5	-5	-5	0	0	0	0	0	+4	+7	+10			
	ei	-49	-55	-62	-76	-98	-31	-34	-40	-47	-61	-83	-19	-22	-28	-35	-49	-71	-11	-14	-20	-27	-41	-63	-6	-9	-15	-22	-36	-58	-90	-2	-2
10	es	-50	-50	-50	-50	-50	-32	-32	-32	-32	-32	-16	-16	-16	-16	-16	-16	-6	-6	-6	-6	-6	0	0	0	0	0	+5	+8	+12			
	ei	-61	-68	-77	-93	-120	-40	-43	-50	-59	-75	-102	-24	-27	-34	-43	-59	-86	-14	-17	-24	-33	-49	-76	-8	-11	-18	-27	-43	-70	-110	+3	-3
18	es	-65	-65	-65	-65	-65	-40	-40	-40	-40	-40	-20	-20	-20	-20	-20	-20	-7	-7	-7	-7	-7	0	0	0	0	0	+5	+9	+13			
	ei	-78	-86	-98	-117	-149	-49	-53	-61	-73	-92	-124	-29	-33	-41	-53	-72	-104	-16	-20	-28	-40	-59	-91	-9	-13	-21	-33	-52	-84	-130	-4	-4
30	es	-80	-80	-80	-80	-80	-50	-50	-50	-50	-50	-25	-25	-25	-25	-25	-25	-9	-9	-9	-9	-9	0	0	0	0	0	+6	+11	+15			
	ei	-96	-105	-119	-142	-180	-61	-66	-75	-89	-112	-150	-36	-41	-50	-64	-87	-125	-20	-25	-34	-48	-71	-109	-11	-16	-25	-39	-62	-100	-160	-5	-5
50	es	-100	-100	-100	-100	-100	-60	-60	-60	-60	-60	-30	-30	-30	-30	-30	-30	-10	-10	-10	-10	-10	0	0	0	0	0	+6	+12	+18			
	ei	-119	-130	-146	-174	-220	-73	-79	-90	-106	-134	-180	-43	-49	-60	-76	-104	-150	-23	-29	-40	-56	-84	-130	-13	-19	-30	-46	-74	-120	-190	-7	-7
80	es	-120	-120	-120	-120	-120	-72	-72	-72	-72	-72	-36	-36	-36	-36	-36	-36	-12	-12	-12	-12	-12	0	0	0	0	0	+6	+13	+20			
	ei	-142	-155	-174	-207	-260	-87	-94	-107	-126	-159	-212	-51	-58	-71	-90	-123	-176	-27	-34	-47	-66	-99	-152	-15	-22	-35	-54	-87	-140	-220	-9	-9
120	es	-145	-145	-145	-145	-145	-85	-85	-85	-85	-85	-43	-43	-43	-43	-43	-43	-14	-14	-14	-14	-14	0	0	0	0	0	+7	+14	+22			
	ei	-170	-185	-208	-245	-305	-103	-110	-125	-148	-185	-245	-61	-68	-83	-106	-143	-203	-32	-39	-54	-77	-114	-174	-18	-25	-40	-63	-100	-160	-250	-11	-11
180	es	-170	-170	-170	-170	-170	-100	-100	-100	-100	-100	-50	-50	-50	-50	-50	-50	-15	-15	-15	-15	-15	0	0	0	0	0	+7	+16	+25			
	ei	-199	-216	-242	-285	-355	-120	-129	-146	-172	-215	-285	-70	-79	-96	-122	-165	-235	-35	-44	-61	-87	-130	-200	-20	-29	-46	-72	-115	-185	-290	-13	-13
250	es	-190	-190	-190	-190	-190	-110	-110	-110	-110	-110	-56	-56	-56	-56	-56	-56	-17	-17	-17	-17	-17	0	0	0	0	0	+7	+16	+26			
	ei	-222	-242	-271	-320	-400	-133	-142	-162	-191	-240	-320	-79	-88	-108	-137	-185	-266	-40	-49	-69	-98	-147	-227	-23	-32	-52	-81	-130	-210	-320	-16	-16
315	es	-210	-210	-210	-210	-210	-125	-125	-125	-125	-125	-62	-62	-62	-62	-62	-62	-18	-18	-18	-18	-18	0	0	0	0	0	+7	+18	+29			
	ei	-246	-267	-299	-350	-440	-150	-161	-182	-214	-265	-355	-87	-98	-119	-151	-202	-292	-43	-54	-75	-107	-158	-248	-25	-36	-57	-89	-140	-230	-360	-18	-18
400	es	-230	-230	-230	-230	-230	-135	-135	-135	-135	-135	-68	-68	-68	-68	-68	-68	-20	-20	-20	-20	-20	0	0	0	0	0	+7	+20	+31			
	ei	-270	-293	-327	-385	-480	-162	-175	-198	-232	-290	-385	-95	-108	-131	-165	-223	-318	-47	-60	-83	-117	-175	-270	-27	-40	-63	-97	-155	-250	-400	-20	-20

• Internal Threads

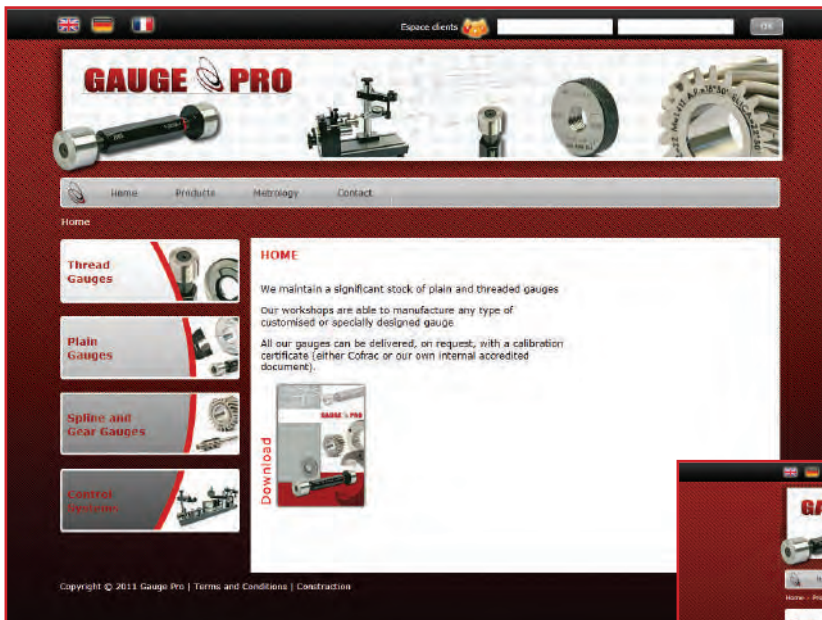
With the top of	Up to and including	D					E					F					G					H							J						
		6	7	8	9	10	5	6	7	8	9	10	5	6	7	8	9	10	5	6	7	8	9	10	11	6	7	8	9						
3	Es	+26	+30	+34	+45	+60	+18	+20	+24	+28	+39	+54	+10	+12	+16	+20	+31	+46	+6	+8	+12	+16	+27	+42	+4	+6	+10	+14	+25	+40	+60	+2	+4	+6	+12,5
	Ei	+20	+20	+20	+20	+20	+14	+14	+14	+14	+14	+14	+6	+6	+6	+6	+6	+6	+2	+2	+2	+2	+2	+2	0	0	0	0	0	0	0	-4	-6	-8	-12,5
3	Es	+38	+42	+48	+60	+78	+25	+28	+32	+38	+50	+68	+15	+18	+22	+28	+40	+58	+9	+12	+16	+22	+34	+52	+5	+8	+12	+18	+30	+48	+75	+5	+6	+10	+15
	Ei	+30	+30	+30	+30	+30	+20	+20	+20	+20	+20	+20	+10	+10	+10	+10	+10	+10	+4	+4	+4	+4	+4	+4	0	0	0	0	0	0	0	-3	-6	-8	-15
6	Es	+49	+55	+62	+76	+98	+31	+34	+40	+47	+61	+83	+19	+22	+28	+35	+49	+71	+11	+14	+20	+27	+41	+63	+6	+9	+15	+22	+36	+58	+90	+5	+8	+12	+18
	Ei	+40	+40	+40	+40	+40	+25	+25	+25	+25	+25	+25	+13	+13	+13	+13	+13	+13	+5	+5	+5	+5	+5	+5	0	0	0	0	0	0	0	-4	-7	-10	-18
10	Es	+61	+68	+77	+93	+120	+40	+43	+50	+59	+75	+102	+24	+27	+34	+43	+59	+86	+14	+17	+24	+33	+49	+76	+8	+11	+18	+27	+43	+70	+110	+6	+10	+15	+21,5
	Ei	+50	+50	+50	+50	+50	+32	+32	+32	+32	+32	+32	+16	+16	+16	+16	+16	+16	+6	+6	+6	+6	+6	+6	0	0	0	0	0	0	0	-5	-8	-12	-21,5
18	Es	+78	+86	+98	+117	+149	+49	+53	+61	+73	+92	+124	+29	+33	+41	+53	+72	+104	+16	+20	+28	+40	+59	+91	+9	+13	+21	+33	+52	+84	+130	+8	+12	+20	+26
	Ei	+65	+65	+65	+65	+65	+40	+40	+40	+40	+40	+40	+20	+20	+20	+20	+20	+20	+7	+7	+7	+7	+7	+7	0	0	0	0	0	0	0	-5	-9	-13	-26
30	Es	+96	+105	+119	+142	+180	+61	+66	+75	+89	+112	+150	+36	+41	+50	+64	+87	+125	+20	+25	+34	+48	+71	+109	+11	+16	+25	+39	+62	+100	+160	+10	+14	+24	+31
	Ei	+80	+80	+80	+80	+80	+50	+50	+50	+50	+50	+50	+25	+25	+25	+25	+25	+25	+9	+9	+9	+9	+9	+9	0	0	0	0	0	0	0	-6	-11	-15	-31
50	Es	+119	+130	+146	+174	+220	+73	+79	+90	+106	+134	+180	+43	+49	+60	+76	+104	+150	+23	+29	+40	+56	+84	+130	+13	+19	+30	+46	+74	+120	+190	+13	+18	+28	+37
	Ei	+100	+100	+100	+100	+100	+60	+60	+60	+60	+60	+60	+30	+30	+30	+30	+30	+30	+10	+10	+10	+10	+10	+10	0	0	0	0	0	0	0	-6	-12	-18	-37
80	Es	+142	+155	+174	+207	+260	+87	+94	+107	+125	+159	+212	+51	+58	+71	+90	+123	+176	+27	+34	+47	+66	+99	+152	+15	+22	+35	+54	+87	+140	+220	+16	+22	+34	+43,5
	Ei	+120	+120	+120	+120	+120	+72	+72	+72	+72	+72	+72	+36	+36	+36	+36	+36	+36	+12	+12	+12	+12	+12	+12	0	0	0	0	0	0	0	-6	-13	-20	-43,5
120	Es	+170	+185	+208	+245	+305	+103	+110	+125	+148	+185	+245	+61	+68	+83	+106	+143	+203	+32	+39	+54	+77	+114	+174	+18	+25	+40	+63	+100	+160	+250	+18	+26	+41	+50
	Ei	+145	+145	+145	+145	+145	+85	+85	+85	+85	+85	+85	+43	+43	+43	+43	+43	+43	+14	+14	+14	+14	+14	+14	0	0	0	0	0	0	0	-7	-14	-22	-50
180	Es	+199	+216	+242	+285	+355	+120	+129	+146	+172	+215	+285	+70	+79	+96	+122	+165	+235	+35	+44	+61	+87	+130	+200	+20	+29	+46	+72	+115	+185	+290	+22	+30	+47	+57,5
	Ei	+170	+170	+170	+170	+170	+100	+100	+100	+100	+100	+100	+50	+50	+50	+50	+50	+50	+15	+15	+15	+15	+15	+15	0	0	0	0	0	0	0	-7	-16	-25	-57,5
250	Es	+222	+242	+271	+320	+400	+133	+142	+162	+191	+240	+320	+79	+88	+108	+137	+186	+266	+40	+49	+69	+98	+147	+227	+23	+32	+52	+81	+130	+210	+320	+25	+36	+55	+65
	Ei	+190	+190	+190	+190	+190	+110	+110	+110	+110	+110	+110	+56	+56	+56	+56	+56	+56	+17	+17	+17	+17	+17	+17	0	0	0	0	0	0	0	-7	-16	-26	-65
315	Es	+246	+267	+299	+350	+440	+150	+161	+182	+214	+265	+355	+87	+98	+119	+151	+202	+292	+43	+54	+75	+107	+158	+248	+25	+36	+57	+89	+140	+230	+360	+29	+39	+60	+70
	Ei	+210	+210	+210	+210	+210	+125	+125	+125	+125	+125	+125	+62	+62	+62	+62	+62	+62	+18	+18	+18	+18	+18	+18	0	0	0	0	0	0	0	-7	-18	-29	-70
400	Es	+270	+293	+327	+385	+480	+162	+175	+198	+232	+290	+385	+95	+108	+131	+165	+223	+318	+47	+60	+83	+117	+175	+270	+27	+40	+63	+97	+155	+250	+400	+33	+43	+66	+77,5
	Ei	+230	+230	+230	+230	+230	+135	+135	+135	+135	+135	+135	+68	+68	+68	+68	+68	+68	+20	+20	+20	+20	+20	+20	0	0	0	0	0	0	0	-7	-20	-31	-77,5

Table of Free Tolerances

js														k						m						n						p					With the top of	Up to and including
5	6	7	8	9	10	11	12	13	14	5	6	7	8	9	10	5	6	7	8	9	10	5	6	7	8	9	10	11	5	6	7	8	9					
+2 -2	+3 -3	+5 -5	+7 -7	+12,5 -12,5	+20 -20	+30 -30	+50 -50	+70 -70	+125 -125	+4 0	+6 0	+10 0	+14 +0	+25 0	+40 0	+6 +2	+8 +2	+12 +2	+16 +2	+27 +2	+42 +2	+8 +4	+10 +4	+14 +4	+18 +4	+29 +4	+44 +4	+64 +4	+10 +6	+12 +6	+16 +6	+20 +6	+31 +6		3		es ei	
+2,5 -2,5	+4 -4	+6 -6	+9 -9	+15 -15	+24 -24	+37,5 -37,5	+60 -60	+90 -90	+150 -150	+6 +1	+9 +1	+13 +1	+18 0	+30 0	+48 0	+9 +4	+12 +4	+16 +4	+22 +4	+34 +4	+52 +4	+13 +8	+16 +8	+20 +8	+26 +8	+38 +8	+56 +8	+83 +8	+17 +12	+20 +12	+24 +12	+30 +12	+42 +12		3	6	es ei	
+3 -3	+4,5 -4,5	+7,5 -7,5	+11 -11	+18 -18	+29 -29	+45 -45	+75 -75	+110 -110	+180 -180	+7 +1	+10 +1	+16 +1	+22 0	+36 0	+58 0	+12 +6	+15 +6	+21 +6	+28 +6	+42 +6	+64 +6	+16 +10	+19 +10	+25 +10	+32 +10	+46 +10	+68 +10	+100 +10	+21 +15	+24 +15	+30 +15	+37 +15	+51 +15		6	10	es ei	
+4 -4	+5,5 -5,5	+9 -9	+13,5 -13,5	+21,5 -21,5	+35 -35	+55 -55	+90 -90	+135 -135	+215 -215	+9 +1	+12 +1	+19 +1	+27 0	+43 0	+70 0	+15 +7	+18 +7	+25 +7	+34 +7	+50 +7	+77 +7	+20 +12	+23 +12	+30 +12	+39 +12	+55 +12	+82 +12	+122 +12	+26 +18	+29 +18	+36 +18	+45 +18	+61 +18		10	18	es ei	
+4,5 -4,5	+6,5 -6,5	+10,5 -10,5	+16,5 -16,5	+26 -26	+42 -42	+65 -65	+105 -105	+165 -165	+260 -260	+11 +2	+15 +2	+23 +2	+33 0	+52 0	+84 0	+17 +8	+21 +8	+29 +8	+41 +8	+60 +8	+92 +8	+24 +15	+28 +15	+36 +15	+48 +15	+67 +15	+99 +15	+145 +15	+31 +22	+35 +22	+43 +22	+55 +22	+74 +22		18	30	es ei	
+5,5 -5,5	+8 -8	+12,5 -12,5	+19,5 -19,5	+31 -31	+50 -50	+80 -80	+125 -125	+195 -195	+310 -310	+13 +2	+18 +2	+27 +2	+39 0	+62 0	+100 0	+20 +9	+25 +9	+34 +9	+48 +9	+71 +9	+109 +9	+28 +17	+33 +17	+42 +17	+56 +17	+79 +17	+117 +17	+177 +17	+37 +26	+42 +26	+51 +26	+65 +26	+88 +26		30	50	es ei	
+6,5 -6,5	+9,5 -9,5	+15 -15	+23 -23	+37 -37	+60 -60	+95 -95	+150 -150	+230 -230	+370 -370	+15 +2	+21 +2	+32 +2	+46 0	+74 0	+120 0	+24 +11	+30 +11	+41 +11	+57 +11	+85 +11	+131 +11	+33 +20	+39 +20	+50 +20	+66 +20	+94 +20	+140 +20	+210 +20	+45 +32	+51 +32	+62 +32	+78 +32	+106 +32		50	80	es ei	
+7,5 -7,5	+11 -11	+17,5 -17,5	+27 -27	+43,5 -43,5	+70 -70	+110 -110	+175 -175	+270 -270	+435 -435	+18 +3	+25 +3	+38 +3	+54 0	+87 0	+140 0	+28 +13	+35 +13	+48 +13	+67 +13	+100 +13	+153 +13	+38 +23	+45 +23	+58 +23	+77 +23	+110 +23	+163 +23	+243 +23	+52 +37	+59 +37	+72 +37	+91 +37	+124 +37		80	120	es ei	
+9 -9	+12,5 -12,5	+20 -20	+31,5 -31,5	+50 -50	+80 -80	+125 -125	+200 -200	+315 -315	+500 -500	+21 +3	+28 +3	+43 +3	+63 0	+100 0	+160 0	+33 +15	+40 +15	+55 +15	+78 +15	+115 +15	+175 +15	+45 +27	+52 +27	+67 +27	+90 +27	+127 +27	+187 +27	+277 +27	+61 +43	+68 +43	+83 +43	+106 +43	+143 +43		120	180	es ei	
+10 -10	+14,5 -14,5	+23 -23	+36 -36	+57,5 -57,5	+92,5 -92,5	+145 -145	+230 -230	+360 -360	+575 -575	+24 +4	+33 +4	+50 +4	+72 0	+115 0	+185 0	+37 +17	+46 +17	+63 +17	+89 +17	+132 +17	+202 +17	+51 +31	+60 +31	+77 +31	+103 +31	+146 +31	+216 +31	+321 +31	+70 +50	+79 +50	+96 +50	+122 +50	+165 +50		180	250	es ei	
+11,5 -11,5	+16 -16	+26 -26	+40,5 -40,5	+65 -65	+105 -105	+160 -160	+260 -260	+405 -405	+650 -650	+27 +4	+36 +4	+56 +4	+81 0	+130 0	+210 0	+43 +20	+52 +20	+71 +20	+101 +20	+150 +20	+230 +20	+57 +34	+66 +34	+86 +34	+115 +34	+164 +34	+244 +34	+354 +34	+579 +34	+79 +56	+88 +56	+108 +56	+137 +56	+186 +56		250	315	es ei
+12,5 -12,5	+18 -18	+28,5 -28,5	+44,5 -44,5	+70 -70	+115 -115	+180 -180	+285 -285	+445 -445	+700 -700	+29 +4	+40 +4	+61 +4	+89 0	+140 0	+230 0	+46 +21	+57 +21	+78 +21	+110 +21	+161 +21	+251 +21	+62 +37	+73 +37	+94 +37	+126 +37	+177 +37	+267 +37	+397 +37	+87 +62	+98 +62	+119 +62	+151 +62	+202 +62		315	400	es ei	
+13,5 -13,5	+20 -20	+31,5 -31,5	+48,5 -48,5	+77,5 -77,5	+125 -125	+200 -200	+315 -315	+485 -485	+775 -775	+32 +5	+45 +5	+68 +5	+97 0	+155 0	+250 0	+50 +23	+63 +23	+86 +23	+120 +23	+178 +23	+273 +23	+67 +40	+80 +40	+103 +40	+137 +40	+195 +40	+290 +40	+440 +40	+95 +68	+108 +68	+131 +68	+165 +68	+223 +68		400	500	es ei	

JS										K						M						N						P					With the top of	Up to and including		
5	6	7	8	9	10	11	12	13	14	5	6	7	8	9	10	5	6	7	8	9	10	5	6	7	8	9	10	11	5	6	7	8			9	
+2 -2	+3 -3	+5 -5	+7 -7	+12,5 -12,5	+20 -20	+30 -30	+50 -50	+70 -70	+125 -125	0 -4	0 -6	0 -10	0 -14	0 -25	0 -40	-2 -6	-2 -8	-2 -12	-2 -16	-2 -27	-2 -42	-4 -8	-4 -10	-4 -14	-4 -18	-4 -29	-4 -44	-4 -64	-6 -10	-6 -12	-6 -16	-6 -20	-6 -31	3	6	Es Ei
+2,5 -2,5	+4 -4	+6 -6	+9 -9	+15 -15	+24 -24	+37,5 -37,5	+60 -60	+90 -90	+150 -150	0 -5	+2 -6	+3 -9	+5 -13			-3 -8	-1 -9	0 -12	+2 -16	-4 -34	-4 -52	-7 -12	-5 -13	-4 -16	-2 -20	0 -30	0 -48	0 -75	-11 -16	-9 -17	-8 -20	-12 -30	-12 -42			Es Ei
+3 -3	+4,5 -4,5	+7,5 -7,5	+11 -11	+18 -18	+29 -29	+45 -45	+75 -75	+110 -110	+180 -180	+1 -5	+2 -7	+5 -10	+6 -16			-4 -10	-3 -12	0 -15	+1 -21	-6 -42	-6 -64	-8 -16	-7 -19	-4 -25	-3 -36	0 -58	0 -90	0 -19	-13 -21	-12 -24	-9 -37	-15 -51	6	10	Es Ei	
+4 -4	+5,5 -5,5	+9 -9	+13,5 -13,5	+21,5 -21,5	+35 -35	+55 -55	+90 -90	+135 -135	+215 -215	+2 -6	+3 -9	+6 -12	+8 -19			-4 -12	-4 -15	0 -18	+2 -25	-7 -50	-7 -77	-9 -17	-9 -20	-5 -23	-3 -30	0 -43	0 -70	0 -110	-15 -23	-15 -26	-11 -29	-18 -45	-18 -61	10	18	Es Ei
+4,5 -4,5	+6,5 -6,5	+10,5 -10,5	+16,5 -16,5	+26 -26	+42 -42	+65 -65	+105 -105	+165 -165	+260 -260	+1 -8	+2 -11	+6 -15	+10 -23			-5 -14	-4 -17	0 -21	+4 -29	-8 -60	-8 -92	-12 -21	-11 -24	-7 -28	-3 -36	0 -52	0 -84	0 -130	-19 -28	-18 -31	-14 -35	-22 -55	-22 -74	18	30	Es Ei
+5,5 -5,5	+8 -8	+12,5 -12,5	+19,5 -19,5	+31 -31	+50 -50	+80 -80	+125 -125	+195 -195	+310 -310	+2 -9	+3 -13	+7 -18	+12 -27			-5 -16	-4 -20	0 -25	+5 -34	-9 -71	-9 -109	-13 -24	-12 -28	-8 -33	-3 -42	0 -62	0 -100	0 -160	-22 -33	-21 -42	-17 -55	-26 -65	-26 -88	30	50	Es Ei
+6,5 -6,5	+9,5 -9,5	+15 -15	+23 -23	+37 -37	+60 -60	+95 -95	+150 -150	+230 -230	+370 -370	+3 -10	+4 -15	+9 -21	+14 -32			-6 -19	-5 -24	0 -30	+5 -41			-15 -28	-14 -33	-9 -39	-4 -50	0 -74	0 -120	0 -190	-27 -40	-26 -45	-21 -51	-32 -78	-32 -106	50	80	Es Ei
+7,5 -7,5	+11 -11	+17,5 -17,5	+27 -27	+43,5 -43,5	+70 -70	+110 -110	+175 -175	+270 -270	+435 -435	+2 -13	+4 -18	+10 -25	+16 -38			-8 -23	-6 -28	0 -35	+6 -48			-18 -33	-16 -38	-10 -45	-4 -58	0 -87	0 -140	0 -220	-32 -47	-30 -52	-24 -59	-37 -91	-37 -124	80	120	Es Ei
+9 -9	+12,5 -12,5	+20 -20	+31,5 -31,5	+50 -50	+80 -80	+125 -125	+200 -200	+315 -315	+500 -500	+3 -15	+4 -21	+12 -28	+20 -43			-9 -27	-8 -33	0 -40	+8 -55			-21 -39	-20 -45	-4 -52	0 -67	0 -100	0 -160	0 -250	-37 -55	-36 -68	-28 -106	-43 -143	120	180	Es Ei	
+10 -10	+14,5 -14,5	+23 -23	+36 -36	+57,5 -57,5	+92,5 -92,5	+145 -145	+230 -230	+360 -360	+575 -575	+2 -18	+5 -24	+13 -33	+22 -50			-11 -31	-8 -37	0 -46	+9 -63			-25 -45	-22 -51	-14 -60	-5 -77	0 -115	0 -185	0 -290	-44 -64	-41 -70	-33 -79	-50 -122	-50 -165	180	250	Es Ei
+11,5 -11,5	+16 -16	+26 -26	+40,5 -40,5	+65 -65	+105 -105	+160 -160	+260 -260	+405 -405	+650 -650	+3 -20	+5 -27	+16 -36	+25 -56			-13 -36	-9 -41	0 -52	+9 -72			-27 -50	-25 -57	-14 -66	-5 -86	0 -130	0 -210	0 -320	-49 -72	-47 -79	-36 -88	-56 -137	-56 -186	250	315	Es Ei
+12,5 -12,5	+18 -18	+28,5 -28,5	+44,5 -44,5	+70 -70	+115 -115	+180 -180	+285 -285	+445 -445	+700 -700	+3 -22	+4 -29	+7 -40	+17 -61			-14 -39	-10 -46	0 -57	+11 -78			-30 -55	-26 -62	-16 -73	-5 -94	0 -140	0 -230	0 -360	-55 -80	-51 -87	-41 -98	-62 -151	-62 -202	315	400	Es Ei
+13,5 -13,5	+20 -20	+31,5 -31,5	+48,5 -48,5	+77,5 -77,5	+125 -125	+200 -200	+315 -315	+485 -485	+775 -775	+2 -25	+8 -32	+18 -45	+29 -68			-16 -43	-10 -50	0 -63	+11 -86			-33 -60	-27 -67	-17 -80	-6 -103	0 -155	0 -250	0 -400	-61 -88	-55 -95	-45 -108	-68 -165	-68 -223	400	500	Es Ei

For further information, visit our website at
www.gauge-pro.com



- Find all our items online
- Login in and request a quotation
- Contact us : sales@gauge-pro.com

SETTING GAUGES - GAUGES - INSPECTION SYSTEMS - CALIBRATION
ON - SETTING GAUGES - GAUGES - INSPECTION SYSTEMS - CALIBRATION
ALIBRATION - SETTING GAUGES - GAUGES - INSPECTION SYSTEMS - CALIBRATION
SYSTEMS - CALIBRATION - SETTING GAUGES - GAUGES - INSPECTION SYSTEMS - CALIBRATION
ON SYSTEMS - CALIBRATION - SETTING GAUGES - GAUGES -

GAUGE PRO

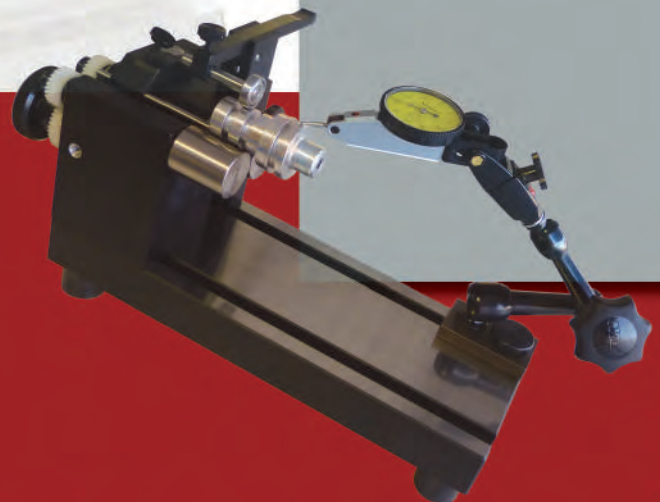
526 rue Claude Ballaloud
74950 SCIONZIER - France

Tel : +33 (0)4 50 96 45 04

Fax : +33 (0)4 50 96 16 93

E-mail : sales@gauge-pro.com

Distributed by



www.gauge-pro.com